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Designing for Change in University Teaching Practices

Mayela Coto Chotto : A Community of Practice Approach to Facilitate University Teacher Professional Development in ICT and Project-Oriented Problem Pedagogy

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DESIGNING FOR CHANGE
in University Teaching Practices

The case of UNAgora

A Community of Practice Approach to Facilitate
University Teacher Professional Development
in ICT and Project-Oriented Problem Pedagogy

Mayela Coto Chotto

Thesis submitted for the degree of Doctor of Philosophy

Aalborg University, Denmark
Department of Communication and Psychology

Costa Rica, December 2010

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Abstract

At many universities around the world initiatives have been taken to promote the use of student-centered pedagogical approaches, as well as information and communication technologies (ICT), in the educational process. A core issue with these initiatives has been the professional development of teachers. Recent research suggests that professional learning presented to teachers within a community of practice framework is more likely to have an effective outcome than the traditional forms of professional development and learning. Furthermore, recent technological developments have created new means of bringing geographically widespread teachers together.

The overall aim of this research is to enhance the understanding of to what extent a distributed community of practice approach affects the professional development of university teachers and whether this leads the teachers to promote a transformation in teaching practices mainly regarding the introduction of ICT and project-oriented problem pedagogy (POPP).

More specific research questions are concerned with what is the impact of belonging to the community of practice on teachers?; what kind of changes takes place in the teachers' practice?; which factors support or hinder the professional development of teachers who are part of a distributed community of practice?; how does technology contribute (or not) to the formation of the community, and to the professional development process?; and what principles may be used to guide the design of a professional development model- based on communities of practice for fostering change of practice?

In the empirical study of this work, a design-based research approach has been selected, as it can be used to develop a design solution that has been tested and refined in a genuine learning context, thus making the solution more useable and reliable. This approach begins with the identification of an educational problem, and then a proposal of a draft design solution is derived from literature review. This is followed by iterative testing where the continuous adjustments to the initial design derive from the transformation of the learning environment as experienced by participants within a genuine context. The final stage is the production of a set of refined design guidelines.

In this study, existing design principles were identified in the literature. The study has its roots in the interlacing of two main theoretical areas: Professional development in higher education and learning in communities of practice. From the professional development area, literature highlights the importance of considering the values and beliefs of teachers as well as the learning principles of adults. The theory of communities of practice provides the framework for making a shift from more conventional

professional development models - based on formal training - to learning in practice. This theory has a basic premise that learning should be understood as participation in social practice. Two other contributing areas of the research are information and communication technology (ICT) and problem-oriented and project-based learning (POPP). Both have a double role in this research: The learning principles of POPP help to inform the design principles for the educational intervention; ICT provides the main communicational infrastructure for it; and both of them have a core role in the process of transforming teaching practices.

From this theoretical basis, design guidelines were proposed for a specific context that became the initial design solution. A group of 27 teachers from five different regional campuses at the Universidad Nacional (UNA) in Costa Rica participated in the educational intervention for a period of ten months. Data has been collected through participant observation in the online dialogue, interviews, workshops, and questionnaires. The data collected was analyzed through a process of comparing, contrasting and categorizing.

The main findings of the study were that the distributed community of practice approach appears to be a productive form of professional development under certain conditions. It provides an environment for learning and dialogue that can enrich and deepen teachers' knowledge, as well as an understanding of important educational issues and change of values, beliefs and practices. Issues of access to technology, culture of online communication and collaboration, teachers' workload and time have been identified as conditions that need to be carefully studied in order for the approach to be potentially effective.

Following features of the approach are found to be effective including the mix of activities deployed: readings, discussing ideas, sharing experiences, flexible use of time, and over-all reflection and the possibility for teachers to make meaning of their learning process from direct experience through the implementation of what was learned. Some features of the approach are identified as requiring further refinement: improving social presence, promote a culture of online communication, strengthen local networks, achieve a balance between online activities and face-to-face activities, and strengthen the integration of content, pedagogy and ICT.

The overall result of the approach to professional development proposed by this study, offers teachers a scope for learning, negotiation and identity formation within the community. The study also suggests that teachers who are closer to the center of the community are able to identify with, and develop a feeling of belonging to the community to a greater extent than the teachers with a peripheral role. However, it seems that both kinds of teachers are able to transform, to some extent, their teaching practices.

Resume

Ved mange universiteter verden over er der blevet taget initiativer til at promovere brugen af elevcentreret pædagogiske tilgange, såvel som informations- og kommunikationsteknologi (IKT) i undervisningsprocesser. En central problemstilling ved disse initiativer har været den professionelle udvikling af undervisere. Nyere tids forskning indikerer at professionel læring præsenteret for undervisere inden for praksisfællesskaber har et forventeligt større udbytte end de traditionelle former for professionel udvikling og læring. Ydermere har nyere teknologisk udvikling givet geografisk adskilte undervisere mulighed for en højere grad af samarbejde.

Det overordnede mål for denne rapports forskning er at fremme forståelsen for i hvilken grad en distribueret praksisfællesskabstilgang påvirker universitetsunderviseres professionelle udvikling i retningen af mulig påbegyndelse af undervisningsændringer hovedsageligt angående indførelsen af IKT samt projektorienteret problembaseret pædagogik (POPP).

Mere specifikke forskningsspørgsmål omhandler hvilken indflydelse det har på undervisere at være tilknyttet et praksisfællesskab?; hvilke ændringer finder sted i undervisernes praksis?; hvilke faktorer understøtter eller forhindrer den professionelle udvikling af underviserer der er en del af en distribueret praksisfællesskab?; hvordan bidrager teknologi til tilblivelsen af fællesskabet, og til den professionelle udviklingsproces?; samt hvilke principper kan bruges til at vejlede designet af en professionel udviklingsmodel – baseret på praksisfællesskabet som igangsætter for undervisningsændringer?

I det empiriske studie af dette arbejde er en designbaseret forskningstilgang blevet brugt, da denne kan bruges til udvikling af designløsninger der er blevet testet og forbedret i en virkelig læringskontekst, hvilket dermed gør løsningen mere brugbar og pålidelig. Denne tilgang starter med identifikationen af et læringsproblem hvorefter et udkast til en designløsning udledes fra litteraturundersøgelser. Dette er fulgt op af iterative tests hvor løbende tilpasninger til designudkastet sker på baggrund af ændringerne i læringsmiljøet som det opleves af deltagerne i den virkelig kontekst. Den sidste del består af produktionen af et sæt forbedrede designguidelines.

I denne rapport bliver eksisterende designprincipper identificeret i litteraturen. Rapporten har sin oprindelse i sammenfletningen af to overordnede teoretiske felter: professionel udvikling i højere uddannelse samt læring i praksisfællesskaber. Inden for feltet for professionel udvikling understreger litteraturen vigtigheden i at overveje de værdier og opfattelser underviserne besidder, såvel som læringsprincipperne for voksne. Teorien omkring praksisfællesskaber fremsætter en struktur til ændring af

traditionelle professionelle udviklingsmodeller – baseret på formel træning – til læring i praksis. Denne teori antager at læring skal forstås som deltagelse i en social praksis. To yderligere medvirkende felter er informations- og kommunikationsteknologi (IKT) og problemorienteret og projektbaseret læring (POPP). Begge besidder en dobbeltrolle i rapportens forskning: Læringsprincipperne i POPP medvirker til at informere designprincipperne i den læringsmæssige indgriben; IKT understøtter princippernes kommunikative infrastruktur; og de har begge en central rolle i processen der udvikler læringspraksisserne.

Med dette teoretiske grundlag bliver et sæt design-guidelines for en specifik kontekst forslået som den foreløbige designløsning. En gruppe på 27 undervisere fra fem forskellige regionale universitetsområder på Universidad Nacional (UNA) i Costa Rica deltog i et læringsindgreb over ti måneder. Data er blevet indsamlet gennem deltagerobservation i onlinesamtaler, interviews, workshops og spørgeskemaer. Den indsamlede data er blevet analyseret i en proces bestående af komparative, modsættende og kategoriserende elementer.

Hovedkonklusionerne i denne rapport var at den spredte praksisfællesskabstilgang fremstår som en produktiv form for professionel udvikling under visse forudsætninger. Den giver et miljø for læring og dialog der beriger og fordyber undervisernes viden, samt en forståelse for vigtige uddannelsesmæssige problemer og ændring af værdier, opfattelser og praksisser. Problemstillinger om adgang til teknologi, kulturen omkring onlinekommunikation og samarbejde, undervisernes arbejdsbyrde og tid er blevet identificeret som omstændigheder der skal studeres omhyggeligt før den forslåede tilgang kan vise sig at være udbytterig.

Følgende elementer i tilgangen, der er en blanding af de benyttede aktiviteter, har vist sig effektive: læsearbejde, diskussion af ideer, erfaringsdeling, fleksibilitet angående tid såvel som generel refleksion og muligheden for at underviserne kan forstå meningen af deres læringsproces fra direkte erfaringer af implementeringen af hvad der var lært. Nogle elementer i tilgangen er blevet identificerede som krævende yderligere tilpasning: At forbedre den social tilstedeværelse, promovere en kultur for onlinekommunikation, styrke lokale netværk, opnå en balance mellem onlineaktiviteter og aktiviteter ansigt til ansigt, og en styrkelse af integrationen mellem indhold, pædagogik og IKT.

Det overordnede resultat af tilgangen til professionel udvikling foreslået i denne rapport tilbyder undervisere et råderum for læring, forhandling og identitetsskabelse inden for fællesskabet. Rapporten forslår også at undervisere der er tættere på centrum af fællesskabet i højere grad er i stand til at identificere sig med, og udvikle et tilhørsforhold til, fællesskabet end undervisere med en mere perifer rolle. Dog forekommer begge typer af undervisere at være i stand til, i nogen grad, at udvikle deres læringspraksis.

DESIGNING FOR CHANGE
in University Teaching Practices

Chapter 1

Introducing the Study

Education is the most powerful weapon which you can use to change the world.
Nelson Mandela

Introducing the Study

The purpose of this research is to understand and conceptualize the professional development of teachers - within higher education - with a focus on communities of practice and the integration of information and communication technology that can lead to a transformation in teaching practices. The study first develops a conceptual understanding of the fundamental principles of three bodies of literature: professional development, communities of practice, and project-oriented problem pedagogy (POPP); and then develops a set of design principles that guide the design for a community-oriented professional development with the potential to transform teaching practices, specifically in relation to the introduction of information and communication technology (ICT) and project-oriented problem pedagogy (POPP).

The research is informed by a socio cultural perspective on human learning and development (Lave & Wenger, 1991; Vygotsky, 1978; Wenger, 1998), where learning is understood as a social process that is linked to a specific context of action. In socio-cultural theories of learning, learning and innovation takes place within social aggregates that share a common practice. In this sense, knowledge emerges by processes of negotiation of meaning and social identification (Fischer, Rohde, & Wulf, 2007).

1.1 Background

Higher education worldwide has been facing numerous changes and challenges. Societal demands, organizational demands, and student demands put pressure on institutions to find ways to improve the quality and effectiveness of their education.

Globalization has created a new cultural, social, political, professional, and technological context that requires new ways of communicating, interacting and learning. The issue of transforming teaching practices needs to be considered as responsive to the advent of globalization and cultural change. New models of teaching-learning have evolved bringing changes in the ways teachers deal with teaching and learning. Principles of long-learning, distance learning and blended learning entail new demands for university teachers (Crawford, 2008). They need to cope with these developments and with the increasing expectations to be competent, in terms of integrating content, pedagogy and technology.

According to Laurillard (2002), the current challenge for university teachers is to go beyond the traditional models of teaching, renewing and developing new teaching and learning models and turning themselves into reflective practitioners of their particular practice. In general, the task of preparing university teachers to meet these challenges relies in teacher professional development programs. Professional development programs are defined, by Guskey (2003), as systematic efforts to bring about change in the teaching practices of teachers, in their attitudes and beliefs, and in the learning outcomes of students.

Literature stresses that professional development programs must address changes in beliefs, knowledge, and habits of practice, in order to achieve changes in the quality of teaching and learning (Gibbs & Coffey, 2004; Kember & Kwan, 2000; Light & Calkins, 2008; Putnam & Borko, 2000; Smyth, 2003). Lloyd and Cochrane (2006) also argue that theory and practice must be interwoven in order to provoke changes in teachers' conceptions of learning, thus "theory informs practice and practice informs theory in reflexive and constructivist ways" (p.17).

Literature also shows that in spite of significant efforts of the universities to change the nature of learning, the traditional model of education is still widely practiced in their classrooms (Fischer et al., 2007; Laurillard, 2002). Lock (2006), identifies that among the reasons for the low impact of professional development programs in supporting teachers' change of practices is the use of the transmission model from experts to teachers; the one-shot and one-size-fits all workshops; and the failure to address context-specific differences. These shortcomings have provoked an interest towards community inspired models.

According to Wenger et al. (2002), communities of practice, are everywhere, whether formal or informal, with people participating in practices of various areas of their life: at work, school, home, and for special interests. People participate in a community of practice because they find value in what they learn, in feeling supported, and in sharing interests with those who have the same passions. They find value in engaging in conversation, exchanging advice, brainstorming solutions to problems, and growing from the insights and support of others.

Thenotion of building learning communities between educators has become a highly valued means for engaging in meaningful and effective professional learning. The type of trust, collegiality, sharing, learning, friendship, and support that literature suggests is beneficial to teachers can be obtained within a community of practice for university teachers. In the context of a community of practice, learning is conceptualized as a process of identity change within a network of social relationships rather than a process of transmission and assimilation of

information (Brosnan & Burgess, 2003).

In the last decade, research has shown that communities of practice can be a catalyst to improving teachers' professional practice (Schlager, Fusco, & Schank, 2002; Sherer, Shea, & Kristensen, 2003), especially when the desired learning goals are complex and continued over extended periods of time (Barab, MaKinster, & Scheckler, 2004; Buysse, Sparkman, & Wesley, 2005; Downes et al., 2002; Fischer et al., 2007; Gallant, 2000; Henderson, 2007; Jawitz, 2007; Lin, Lin, & Huang, 2008; Lisewski, 2005; Lock, 2006; McDonald & Star, 2006; Pachler & Daly, 2006; Schlager & Fusco, 2004; Sherer et al., 2003; Sobrero & Gale, 2008; Warhurst, 2006; Wing Lai, Pratt, Anderson, & Stigter, 2006). However, although this type of knowledge sharing is highly valued in the field of education, there are many obstacles that inhibit this kind of professional learning. University teachers rarely transcend their everyday individual obligations to evolve as members of productive teams. They are also severely pressed for time with the increasing demands of teaching and research, and not always receiving incentives and support from the institution for participating in professional development activities. In addition, given the current predominance of conventional professional development approaches, it is highly likely that many teachers do not have the knowledge, experience and skills involved in working as a member of a community of practice.

Under this context, this research aims to investigate whether a community of practice-oriented professional development model is able to open up to a new practice for university teachers and provide the ongoing support which needed for transforming their pedagogical beliefs and practice.

1.2 Description of the Research Setting

During the last years, the Universidad Nacional (UNA) in Costa Rica has been undergoing a profound process seeking to strengthen its identity and positioning as a leading educational institution in the country. In 2004, the university decided as part of this process to formulate a pedagogical model that would promote the institutional identity, strengthen teaching and learning processes, improve curriculum management, and promote the professional development of teachers. In this new pedagogical model, teaching and learning are understood as a social, historical and cultural process that goes beyond the mere transmission of knowledge.

The new model also assumes innovative methodologies and teaching practices, and alternative learning environments that rely on

new technologies, thus the role of ICT in this process is not only seen as a means to facilitate the interaction between teachers, students and learning content, but as an agent of change that affects the pedagogical practice.

In order to prepare university teachers for making an effective application of the pedagogical model in classrooms, UNA has developed an institutional program of teacher professional development that seeks to provide modules of pedagogy, evaluation and didactics with the goal to improve teaching performance in the classroom; and enhancing the capacity of teachers to create student-centered learning environments supported by technology (Sánchez et al., 2008). However, many of the institutional efforts in the professional development arena are placed on the central campus of UNA where the majority of students and teachers are concentrated. It means that teachers, who work in the regional campuses at UNA, have few opportunities to be part of the institutional professional development initiatives.

It is at this point that UNA's institutional interests and my own interest as researcher converge to formulate a project that is seen as an exploratory response to (1) the institutional goal to support the process of pedagogical innovation in the regional campuses, (2) the desire of regional teachers to receive training in how to integrate ICT into their educational practice, and (3) my own research interest in alternative ways to support sustainable changes in university teaching practices.

The study began in March 2008 with a group of 30 teachers from five geographically distributed campuses who have diverse fields of knowledge and diverse approaches to teaching and learning as results of their own professional experiences and context. The study is the first initiative of UNA in the field of online teacher professional development. In chapter three more detailed information of the research context is provided.

1.3 Research Questions

After considering the background and the research context outlined in this introduction I formulated a main research question and a number of related secondary research questions. The main research question, and the key focus on the design and conduct of the study, is:

> *To what extent can a professional development framework based on the principles of communities of practice support a transformation of teaching practices in higher education, specifically regarding the introduction of ICT and POPP?*

From this research question, the following sub-questions have emerged:

- What is the impact of belonging to the community of practice on teachers?
- What kind of changes takes place in the teachers' practice?
- Which factors support or hinder the professional development of academics who are part of a distributed community of practice?
- How does technology contribute (or not) to the formation of the community, and to the professional development process?
- What principles may be used to guide the design of a professional development model-based on communities of practice for fostering change of practice?

In order to properly address the research questions, a design-based research methodology was selected. Design-based research is a methodological approach oriented to understand how, when, and why educational innovations work in practice (Design-Based Research Collective, 2003; Wang & Hannafin, 2005). This approach is extensively discussed in chapter 4.

Thus, this study seeks, through a design-based research approach, to design, implement, and evaluate a community of practice approach to teacher professional development. It documents the experiences of twenty-seven teachers as they were part of the community. These experiences comprise narratives about how belonging to the community of practice impacts the teachers and their practices; the motivators and obstacles that they faced; and what was the role of the technology in the formation of the community. In addition, the study provides a set of principles that can guide the design of a professional development model-based on communities of practice for fostering change of practice.

1.4 Outline of the Thesis

This thesis has been organized into ten chapters. Chapter 1 introduces the background and context of the study and defines its purpose and aims.

Chapter 2 has as a purpose to develop an understanding of the theories involved in the study. It addresses the literature about professional development, communities of practice, and problem-

oriented project pedagogy.

Chapter 3 describes the context in which this research is embedded. It traces the historical trajectory of UNA in the process of integrating ICT in the educational process, and describes the Pedagogical Model and the Professional Development System. It also introduces the specific case of interest in this study.

Chapter 4 describes the methodology and the design of the study. The methodology of design-based research is described in detail. This chapter also provides an overview of the ways data was collected and how it was analyzed. It ends with a discussion of quality criteria and ethical issues.

Chapter 5 deals with developing a design solution grounded in the theoretical principles presented in chapter 2. The chapter presents the set of conceptual principles and guidelines that emerged from the literature review as well as the conceptual design that reifies those design principles.

Chapter 6 presents, in a narrative form, an account of how the design of the intervention was enacted by the participating teachers. The story communicates the events, the context and the intentions that drive the actions, and describes the history and evolution of the design over time.

Chapter 7 presents the findings of the study. Teachers' participation, identification and engagement are analyzed, as well as the factors that motivate and limit them to participate in the community.

Chapter 8 analyzes the design solution itself. It introduces the modifications that were made to the design in the process of refining, and then following Wenger's learning architecture (1998) examines the design from three edges: (1) the conceptual perspectives of the four dualities (participation/ reification, designed/ emergent, local/ global, identification/ negotiability); (2) the three modes of belonging (engagement, imagination and alignment); and (3) teachers' perspective.

Chapter 9 examines each one of the five research sub-questions; what is the impact of belonging to the community of practice on teachers?; What kinds of changes take place on teachers' practice?; Which factors support or hinder the professional development of academics as part of a distributed community of practice?; How does technology contribute (or not) to the formation of the community, and to the professional development process?. And what principles may be used to guide the design of a professional development model-based on communities of practice for fostering teachers' change of practice?.

Chapter 10, the last chapter, begins by answering the overall research question, and then presents reflections on the theory, the methodology, the sustainability of the study, as well as reflections on issues of scalability and generalizability. The chapter concludes with suggestions for further work.

The study also presents, as appendices, some of the instruments that were used to collect data, as well as other documents relevant to the research. Most of the documents are written in Spanish because it is the mother language of the teachers participating in this study.

Chapter 2

Developing an Understanding of the Theories Involved in the Research

Practice is an effective teacher and the community of practice an ideal learning environment.

Brown & Duguid, 2000, p.127

Developing an Understanding of the Theories Involved in the Research

This chapter aims to present the core theoretical concepts in this research. The two major research areas relevant here are professional development in higher education and learning in communities of practice. Thus, it is important to ground this review in literature and evidence that strongly link effective professional development with communities of practice. Two contributing areas of the research are information and communication technology (ICT) and project-oriented problem pedagogy (POPP[1]). Both have a double role in this research. The learning principles of POPP help to inform the proposed educational intervention; ICT provides the communicational infrastructure for the community; and both of them (POPP and ICT) have a core role in the process of transforming teaching practices.

The main body of this chapter is divided into four sections. The first section addresses the area of professional development, and it argues that there has been pressure for educational changes at university level and that those changes influence the type of professional development required by university teachers. This section also discusses the importance and effect of new pedagogical approaches and technology in the professional development of university teachers. The second section concentrates on the conceptual framework of communities of practice, with a focus on their fundamental characteristics and principles of learning, participation and identity. The third section introduces the concept of project-oriented problem pedagogy, and how this pedagogical approach relates to the theoretical tenets of communities of practice. To conclude this chapter, the fourth section examines the extent to which the concept of communities of practice can support the professional development of university teachers.

Generally, the literature review of this chapter provides information needed to support the design of an intervention - based on the principles of effective communities of practice for teachers'

1 In the literature, PBL is known as problem-based learning and/or project-based learning. The first focuses on solving problems and the second on project work and often in the production of an artifact as outcome. POPBL (project-oriented problem-based learning) and POPP (project-oriented problem pedagogy) are both names for the Danish approach to PBL. It combines project group work with the formulation and solution of a relevant problem. In this study, I have chosen to use the POPP acronym.

professional development - that aims to support UNA teachers in the process of transforming their teaching practice.

2.1 Professional Development

This section presents an overview of what we understand by professional development and why it is important. It continues with a review of professional development in new educational technologies; the elements that need to be considered when designing ICT for professional development; and factors that contribute to support or hinder professional development of university teachers. The section concludes with a presentation of professional development models, and introduces the framework of community of practice as an effective approach to professional development.

2.1.1 What is professional development?

While some countries refer to higher education teachers as faculty, others refer to them as staff, academics, or university teachers. Consequently, the term professional development is used interchangeably as staff development (Shannon & Doube, 2004; Taylor, 2003), faculty development (Layne, Froyd, Simpson, Caso, & Merton, 2004; Sherer et al., 2003; Sorcinelli, Austin, Eddy, & Beach, 2006), teacher professional development (Bredeson, 2002; Knight, Taitb, & Yorkec, 2006; Lisewski, 2005), and academic professional development (Smyth, 2003; Spratt, Palmer, & Coldwell, 2000). The term teacher professional development is generally used for pre-service and in-service teachers in school and high-school contexts, and the other terms are more related to higher education or university contexts. In the same line of ambiguity, Bredeson (2002) states that "we use the terms in-service, staff development, continuing education, training, and self-improvement interchangeably with professional development with little regard for any conceptual and/or practical differences" (p.663).

In the context of this study, I use the terms academics, university teachers or just teachers to refer to educators at university level, and the term professional development to cover the range of activities that universities use to prepare and support academics in their roles as teachers, researchers and administrators.

There are several understandings of professional development. According to Bligh (2005), professional development aims to improve

practice, to develop strengths and skills, and to manage change. It is expected to result in improved teaching performance and better learning outcomes for students. For Dall' Alba and Sandberg (2006), professional development comprises formal and structured courses or activities as well as the informal development of professional skills that occurs in the workplace.

According to Caffarela and Zinn (1999), professional development for academics in higher education involves three different types of activities: (1) self-directed learning experiences, (2) formal, professional development programs, and (3) organizational development strategies. Self-directed learning experiences are activities that academics plan and implement by their own, such as preparing and teaching classes, designing new courses, supervising dissertations and conducting research. In the category of formal, professional development programs, they classify the initiatives oriented towards improvement of teaching, development of new skills in the use of technology, and towards emphasizing scholarship and research. The third area of organizational development is related with a systematic effort towards organizational change (Caffarella & Zinn, 1999).

For Knight et al. (2006) professional learning is systemic; it is "an interplay between individuals and their environments. This cast professional development as the development of capabilities that occurs as a consequence of situated social practices" (p.320). They stress the importance of non-formal learning that takes place in the course of events, and argue that formal professional development such as courses, workshops and conferences should be seen as a complement and should not displace the situated and informal social learning (Knight et al., 2006).

Lawler and King (2003, p.88), propose an integrative approach to professional development based on five assumptions:

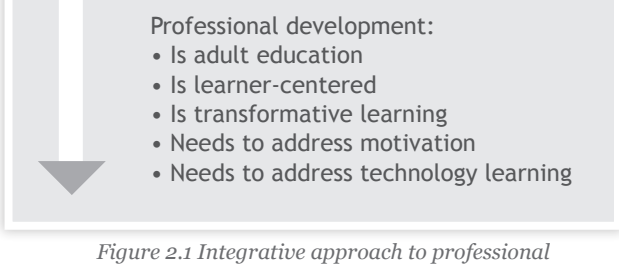


Figure 2.1 Integrative approach to professional development (Lawler & King, 2003, p.88)

In their approach, the first and second assumptions provide the theoretical and methodological foundations for designing, planning and delivering professional development initiatives. Conceptualizing professional development as transformative learning fosters reflective practice; challenges assumptions, beliefs, and values; and empowers individuals to transform their perspectives. The fourth assumption highlights motivation as a key component in learning and changing processes, and the fifth assumption arises from the challenge of preparing people to deal with the needs and demands of an increasingly technological society.

2.1.2 Why is professional development necessary?

Advances in information and communication technology are creating new opportunities to design innovative environments to support learning and, along with students and knowledge society requirements, these new opportunities create in turn new demands for universities, and consequently for their academics. In the last years, academics have been struggling with changing institutional policies that increase expectations on them. The nature of their roles and responsibilities are changing as well as the mechanisms through which academics carry out their work (Crawford, 2008).

A predominant trend in the literature discussion about professional development in universities address the need to shift teaching practices from a model based on delivery of information towards a pedagogy favoring learning as knowledge construction. But, in spite of significant efforts to change the nature of learning, the traditional model of education is still widely practiced in universities (Fischer et al., 2007; Laurillard, 2002). According to Laurillard (2002), the current challenge for academics is to go beyond the traditional models of teaching. Academics have to renew and develop their teaching and learning models, turning themselves into "reflective practitioners with respect to their teaching" (p.20). Moreover, she argues that universities must facilitate and reward a professional approach to teaching.

To change a long tradition of teaching focusing on the transmission mode entails many challenges for universities. First, unlike most teaching professionals in other educational levels (for example school and high-school), academics in higher education typically have no formal preparation for their teaching responsibilities at the university, they generally lack understanding of teaching and learning strategies and,

as a result, they are likely to teach as they were taught (Gallant, 2000; Layne et al., 2004; Reeves, Herrington, & Oliver, 2004). In result, the quality of teaching ends depending on several factors such as teachers' motivation, commitment and level of teaching expertise.

Second, research has shown that teachers' prior knowledge, beliefs and experiences influence their approaches to teaching, and those are closely correlated with students' outcomes and their approaches to learning, ultimately affecting the quality of student learning (Entwistle & Smith, 2002; Smyth, 2003; Trigwell, Prosser, & Waterhouse, 1999). These findings suggest that it is important to acknowledge teachers' beliefs, assumptions and expectations when attempting to promote sustained change in teaching practice. Since teacher beliefs can hinder or foster change, these beliefs need to be explored as part of the professional development process. Therefore, providing teachers with opportunities for reflection upon the conceptions of teaching and learning becomes a basic framework for improving teaching and learning in higher education (Gibbs & Coffey, 2004; Light & Calkins, 2008; Smyth, 2003).

Literature also stress that professional development programs must address changes in academics' conceptions of teaching in order to achieve changes in the quality of teaching and learning. Light and Calkins (2008) explain the difference between conceptions of teaching and approaches to teaching. For them, the term conception expresses how an academic "experiences or understands the practice of teaching in higher education" (p.28), and approach to teaching refers to how academics "plan to execute the practice and include the nature of the intentions/motivations and the strategies they plan to implement to achieve those intentions" (p.28). Both concepts are closely related, with the approach usually driven by the conception. In other words, a university teacher with an advanced conception of the practice usually shows an advanced approach to teaching; however institutional constraints such as time demands, institutional culture, award systems only for research, and high numbers of students can hinder the implementation of the approach. On the other hand, academics without an advanced conception of teaching are unlikely to show an advanced approach to it (Kember & Kwan, 2000). In other words, academics with a conception of teaching as transmission of knowledge are more likely to use teacher-centered approaches and those who regard teaching as facilitating students' construction of knowledge tend to use learning-centered approaches (Kember & Kwan, 2000).

In a study of 22 universities in eight countries, Gibbs and Coffey

(2004) found that professional development can increase the extent to which academics adopt student-centered approaches to teaching. In this connection, Smyth (2003) found that when teachers have opportunities to explore, discuss and reflect about their teaching conceptions and practice, they become less resistant towards different pedagogical approaches. This seems to suggest that reflective thinking might be the strategy to promote this kind of transformative learning in academics (Cranton & King, 2003).

In Schön's theory of reflective practice, academics who practice reflection-in-action, are more willing to question the principles underlying their perception about their professional practice. Layne et al. (2004) also highlight the importance of reflective practice. In their opinion, without reflective practice to examine their beliefs, assumptions, values, and new ways of thinking about teaching and learning, academics will turn to what is familiar to them and continue with their current practices.

In conclusion, for universities and for professional development programs whose goals are to promote and sustain transformation in teaching practices, it is not only important to enhance academics' knowledge of their disciplines, the pedagogy of those disciplines and approaches and skills necessary to provide effective teaching, but also to provide opportunities for academics to become professionals in the sense of being reflective practitioners of the pedagogy of their subject (Laurillard, 2002).

2.1.3 Professional development in ICT

As I have discussed in the previous section, university teachers are facing new institutional policies and new demands in their responsibilities and roles. The development and growth of Information and Communication Technologies (ICT) is part of those new demands. ICT is increasingly being used to support teaching in higher education; currently academics usually work in an environment surrounded by technology with high expectations to its potential benefits for the learning environment (Unwin, 2007; Wake, Dysthe, & Mjelstad, 2007).

Price et al. (2005) suggest that technology should be seen as a tool to mediate learning rather than just a means of delivery. This conceptualization and the communicative, interactive, and adaptive capabilities of the technology are useful to understand its potential in

supporting different kinds of interactions among teachers and students, and consequently understand the potential of technology to move towards models of learning with less focus on transmitting knowledge and more oriented towards promoting skills based on experiential learning and problem/project based learning. However, the design of these learning environments which use technology in an innovative and effective way, represent another burden for university teachers (Laurillard, 2002).

According to Price et al. (2005), the impact of ICT in universities can be seen in different levels: (1) an increase in technological resources that encourage complementary activities, (2) at the level of organizational changes in institutional policies toward the use of technology for teaching and learning, (3) at the level of emerging professional development programs to support academics in their practice, (4) a focus on pedagogical approaches and quality of teaching and, (5) a change in social practices that result in the need to adapt technology into educational delivery.

Undoubtedly, using ICT in higher education has generated benefits. In the report "Review of the impact of technology-enhanced learning on roles and practices in Higher Education", Price et al. (2005) draw on Bates (2000) to discuss some of them:

- Learners are able to access high-quality teaching and learning at any time, at any place;
- Information previously available only through a professor or instructor is accessible on demand through computers and the Internet;
- Well-designed multimedia learning materials can be more effective than traditional classroom methods because students can learn more easily and more quickly through illustrations, animations, different structuring of materials and increased control of and interaction with learning materials;
- New technologies can be designed to develop and facilitate higher order learning skills, such as problem-solving, decision-making and critical thinking;
- Interaction with teachers can be structured and managed through on-line communications to provide greater access and flexibility for both students and teachers; and

- Computer-mediated communication can facilitate team teaching, use of guest faculty from other institutions, and multicultural and international classes (p.7-8)
- Besides these benefits, we can mention others such as:
- Technology brings opportunities to rethink teaching and learning and to change and reform practice (Dirckinck-Holmfeld, 2002). Its effective use can promote a student-centered approach, in which students construct rather than receive knowledge, and teachers provide a framework that facilitates students' learning.
- Networked technologies can provide an alternative professional learning experience for teachers that involves participation in a community of learners, and help encourage them to learn new norms, values, and practices through participation in new forms of activity (Coto & Dirckinck-Holmfeld, 2008).

In order to realize those benefits, an effective integration of technology into a broader strategy of teaching and learning is needed. Technology by its own is not the solution to all educational problems and its use does not necessarily mean an improvement in practice, hence the design and pedagogy should be considered central to its integration in higher education. "Although technology infrastructure plans are essential, they are not sufficient. It is equally important to develop academic or teaching plans that specify the ways in which technologies will be incorporated into teaching learning activities" (Bates, 2000, p.46). Conversely, it is relevant to consider how deep knowledge on learning could be incorporated into the design of new technologies to support and enhance educational processes.

But again, to achieve this double objective is not an easy task, usually, as I have commented in the previous section, university teachers have not received formal training in pedagogy, and many of them are not comfortable using technology. Some use technology mainly for searching and communicating, so it is difficult for them to adequately manage the introduction of technology with pedagogical purposes in their teaching practice. When designing professional development programs, it is important to question what academics need to know in order to

introduce technology into their practice with pedagogical purposes, what is needed for them to engage positively and critically with ICT and which models of professional development are more suitable to produce a better and deep understanding.

Researchers have identified several reasons why it is difficult for academics to integrate technology into their teaching practice: rapid rate of technology change, complex learning infrastructure, inappropriate design of software, conceptions of teaching, lack of experience in teaching with technology, the situated nature of learning, inadequate professional development, an emphasis on "what" instead of "how", high workload, lack of time, lack of motivation and inadequate support from institutions (Brennan, McFadden, & Law, 2001; Mishra & Koehler, 2006; Schifter, 2000; Scribbins, 2002; Shannon & Doube, 2004).

Staying updated consumes time and effort; new technologies change rapidly and time is a scarce resource for teachers, both factors impact teachers' engagement with ICT. This situation is even more critical for part-time and short-term academics who, in many universities, are prevalent and who could be more reluctant to invest additional time learning about the latest technologies and how to mediate them with pedagogies that do not replicate the transmission learning model (Unwin, 2007).

2.1.4 Professional development and problem and project-based learning

As I have discussed in the above sections, technology per se do not change educational practices. A broader strategy of teaching and learning is needed to move from the traditional educational model towards student-centered models, and to support a successful integration of technology and pedagogy.

Project-oriented problem pedagogy (POPP) is an interdisciplinary, contextualized, student-centered learning approach (Lehmann, Christensen, Du, & Thrane, 2008). POPP also known as Problem-oriented and project-based learning (POPBL) or the Aalborg Model is the Danish approach to problem-based learning (PBL).

POPP is a combination of a problem-based and a project-organized approach where students analyze and define problems within a defined subject frame and then work together in groups on a project (Kolmos, Fink, & Krogh, 2004). The fundamental difference with PBL

is the point of departure for the learning process (Dirckinck-Holmfeld, 2002). Whereas the point of departure in PBL is a problem usually set by the teacher, the textbook or a fixed curriculum focusing on problem solving, the starting point in POPP is the students themselves who, in collaboration with supervisors, work on defining the problem to be researched and acted on. POPP especially focuses on the problem formulation as point of departure for the learning activities. Through formulating the problem, the students are encouraged to rethink the problem situation and to argue why and how the problem is interesting for research from a societal, scientific and a personal perspective.

POPP is a pedagogical framework with roots in the constructivist sociocultural approach of understanding learning and education (Kolmos & De Graaff, 2007). It incorporates a series of integrated didactical principles as basis for the design of the learning environment: problem formulation, enquiry of exemplary problems, participant control, interdisciplinary approaches, joint projects and action learning (Dirckinck-Holmfeld, 2002; Graaff & Kolmos, 2003).

- Problem formulation and enquiry of exemplary problems: learning is organized around problems, and this is a central principle for development of motivation. In order to understand and solve the problem, students have to go through different systematic stages: preliminary enquiry, problem formulation, theoretical and methodological considerations, experimentation and reflection.
- Participant control: students in collaboration with the supervisors define and formulate the problem. It allows the learning content to be related to the context and learner's experience, which promotes the student's motivation and comprehension. It also implies that the institution or the teacher cannot fully control the learning process.
- Interdisciplinary learning: problems can extend beyond traditional subject-related boundaries and methods.
- Joint projects and action learning: learning is a social act in which learning takes place through dialogue, communication and collaboration in joint groups. Often, the projects are carried out in collaboration with companies and public institutions.

As a pedagogical approach, POPP can be used to shift from a model based on delivery of information towards a pedagogy favoring learning as knowledge construction through collaboration, projects and problem orientation (Dirckinck-Holmfeld, 2002; Kolmos et al., 2004). However, as with technology, the POPP approach requires new roles and skills from university teachers.

Zimmerman and Lebeau (2000, cited in Kolmos, Du, Holgaard, & Jensen, 2008, p.14) identify the role of teachers in a student-centered learning environment:

- Teaching activity should emphasize learning by doing and hands-on problem solving.
- Students should be encouraged to analyze and interpret information.
- Students should be supported to foster new understandings based on past experiences.
- Teachers should help students to relate the theories and their past experiences to the practice.
- Teachers should help students to have regular reflection and evaluation on their learning activities, and to become self-directed learners.

In a problem-oriented and project-based learning environment, the teachers' role involves (1) interpreting the formal curriculum for students, allowing them to mediate between their own ideas and the institutional demands, (2) guiding students in the processes of problem-analysis and investigation (3) responding to preliminary products from the group, and (4) assessing and grading the results (Jensen & Krogh, 2008, p.7). In addition, teachers must be able to: inspire the students' reflection process; be open for alternative solutions to problems; argue to include essential theory and methods in the project work; influence work distribution among project members; and make sure the students' individual competences are developed on time (Borch, Helbo, & Madsen, 2006, p.193).

From the above list of new roles, it is easy to see that to move from a teacher-centered approach towards a student-centered approach as POPP is a big challenge for university teachers. The transition from

the traditional lecturer role to a role of facilitating learning is difficult for many academics. Teachers need professional development opportunities to learn about the theory and practice of POPP, to examine their beliefs, assumptions, and values about the approach, and to learn how to integrate content, pedagogy and technology.

Among the factors for a successful POPP environment, Borch et al. (2006) identify engagement, responsibility, staff collaboration and an open mind. In section 2.3, I will discuss how a POPP learning approach can help foster a learning community of practice for teachers.

2.1.5 Towards changing academic practices

In their study about the barriers for university teachers in using online learning management and content creation systems, Shannon and Doube (2004) identified a difference between the value that teachers give to technology and the use they make of it. They argue that adoption of technology could be encouraged through promoting the professionalization of teaching, giving more status to the activity of teaching, and structuring professional development programs that promote a research-based approach to teaching and to the use of technology. In this respect, Dearn et al. (2002) argue that professionalization of higher education teaching will require the articulation of the professional knowledge base that underpins the practice of university teaching; the ways staff develop this professional knowledge; agreed standards of professional practice; and the ways in which attainment of these standards of professional practice can be validated and recognized publicly (p.1). They discuss that preparation and support of the academics' teaching practice at universities is largely unsystematic, despite of the recognition of the importance of teaching in higher education and in spite of the growing understanding of how to support their expertise.

In the same vein, Laurillard (2002) argues that while what counts as higher learning is not defined, it is difficult to specify how technology can support new learning models rather than support transmission of knowledge from university teachers to students (Unwin, 2007). She argues that technological tools such as multimedia, video, word processors and the Web have been used by academics to support the transmission model of learning. As a consequence, there is no improvement in how academics teach, despite the potential of the new technology to transform the learning process into one that better

suits the knowledge that society demands. She suggests that university teachers should be reflective practitioners about their teaching practice, involving a scholarship of teaching. In her opinion "universities must support a professional teaching approach that mirrors the approach for research" (Laurillard, 2002, p.25). Her conclusion is that in order to have a more professional approach to teaching, it is necessary to have a common understanding of the kind of learning required at universities, as well as the creation of institutional conditions that foster and reward the professional approach to teaching and reflective practice.

2.1.6 Principles of professional development

In order to develop an effective professional development program is necessary an understanding of what literature says about the fundamental principles supporting this kind of professional learning environments. In this section four models of professional development are presented.

For Lloyd and Cochrane (2006), effective professional development should foster changes in "beliefs, knowledge, and habits of practice" (p.17). They argue that theory and practice must be interwoven in order to provoke changes in teachers' conceptions of learning, thus "theory informs practice and practice informs theory in reflexive and constructivist ways" (p.17).

In a study carried-out to identify the characteristics of ICT teachers' professional development (not specifically in higher education contexts), Lloyd et al. (2005) found four components of effective professional development: (1) context, (2) time, (3) community, and (4) personal growth. In their opinion,

Effective professional development has to immerse an individual in his or her community, directly address the context of teaching and learning, add to personal growth, and be both 'over' time and 'in' time. These elements are to be viewed as being the stepping-stones between practice and theory (p.11).

Context is related with teaching and learning practice and can be identified in terms of relevance and immediacy. Effective professional development must be relevant, practical and meaningful. It must have a direct and sustained impact, addressing teachers' immediate and ongoing needs.

Time is a critical success factor. Effective professional development must be timely, prolonged, ongoing and sustained and must provide adequate time for participation, reflection and implementation.

Community is related to professional collaborations and connections within local and broad communities. Effective professional development must encourage sharing stories, experiences, and collaboration with colleagues, expanding professional and personal networks.

Personal growth refers to the teachers' cognitive challenges. Effective professional development must increase personal skills considering the teachers' prior knowledge, enhance their status within the learning community, support their lifelong learning through reflection and allow them to take responsibility for their own learning (Lloyd & Cochrane, 2006; Lloyd et al., 2005).

Lawler and King (2000) proposes a model for professional development called Adult Learning Model of Faculty Development. The model aims to provide a strategic framework for faculty developers based on the theories of adult learning, adult education and professional development. They present six adult learning principles to guide professional developers: "create a climate of respect, encourage active participation, build on experience, employ collaborative inquiry, learn for action, and empower the participants" (p.21-22). From an adult education perspective, professional development programs have to consider the characteristics of academics as adult learners and be aware of their problems, pressures and concerns. Furthermore, academics bring with them educational and life experiences, as well as learning preferences (King, 2002) that need to be considered and respected in any professional development initiative. Lawler (2003) argues that the expertise and experiences of academics shape their current perspectives on teaching and learning, influences their future teaching practice, and can even affect their motivation to participate in professional development activities. The perspective on adult learning "will provide a foundation for developing ownership, motivation and participation in faculty development programs" (Lawler & King, 2001, p.2).

The proposed model has four stages: preplanning, planning, delivery and follow-up. Each stage considers the principles of respect, collaboration, experience, action and participation. The model aims to foster a teachers' positive perception towards professional development and to enhance the possibility of learning taking place, empowering

and helping teachers to make the changes needed to improve their professional roles (Lawler & King, 2001). From their work, it is possible to deduce the following guidelines. Professional development programs should:

- Consider the academics' needs for learning and change, their interests, experiences and capabilities
- Consider institution visions and needs
- Be tied to university reward systems
- Be delivered in a professional and appropriate way
- Emphasize that practical applications and connections to academics' work. Content and processes should be relevant
- Be aware of diverse learning styles, discipline specific characteristics and work constraints
- Support changes in thinking and behavior, along with consideration of further development activities
- Empower academics in their work
- Build a climate of respect and provide opportunities for collaboration and participation
- Provide opportunities to implement what is learned

Within the same framework of adult learning, and in the context of supporting university teachers to accept and use new learning technologies, Gallant (2000) proposes four principles of effective, professional academic development: responsiveness, continuity, community, and constructive activity.

- Responsiveness: It is essential to be responsive to the individuality of academics, including their preferences for teaching and learning, prior experiences, and attitudes toward change and innovation adoption.
- Continuity: Training sessions offered only once are not as effective as initiatives designed and offered on an ongoing, incremental, and cumulative basis.
- Community: Building communities based on teachers'

discipline networks can help teachers' knowledge grow. "The boundaries of each community can be used to create a safe place to make errors, experiment, complain, tell success stories, and think reflectively" (p.76).

- Constructive Activity: In order to increase the opportunities for change, academics should experience the teaching and learning conditions they plan to create for their own students through activities such as real-world tasks and problems, action and reflection, question established practice, trial and error, and explore different technology applications.

Likewise, King (2003) identified a range of considerations that professional development of academics in technology must address:

(1) Academics usually manage overloaded schedules – the contents should be pertinent and in accessible formats.

(2) Academics may feel embarrassed by not being familiar with technology applications – the learning environment should make them feel safe and respected.

(3) Academics are experts in their disciplines, dealing with technologies could challenge their identity as experts – professional development should cultivate a respectful climate, it should help academics to learn technology based on their strengths.

(4) Learning technology is a universal need – professional development programs can provide skills and strategies for academics to envision themselves as lifelong learners.

(5) Many academics have little preparation in how to integrate technology into teaching and learning – they need learning experiences to engage and discover educational technology and apply it in consideration of pedagogical principles.

(6) Academics need support to integrate technology in their curricula – professional development programs should seem as a bridge between technology and their expertise fields, and help them in the integration of both elements.

(7) Learning communities among academics promote teaching excellence –the professional development model should tie together cooperative learning and practice. Hence, the community of practice approach (Wenger, 1998) to discover and share new perspectives will be more effective than isolated professional development initiatives.

(8) Each academic has his/her own individual learning style, area of expertise and teaching style – professional development programs should take this individuality into account.

Table 2.1 shows the four approaches presented above, while three of them focus on professional development to educators of adults (Gallant, 2000; King, 2003; Lawler & King, 2000), the remainder is more general to teachers in all education levels (Lloyd et al., 2005). In the same way, three of them are oriented to professional development in the integration of technology in educational processes (Gallant, 2000; King, 2003; Lloyd et al., 2005), and the other one comprises general guidelines for professional development, yet considering the principles of adult learning (Lawler & King, 2000).

In chapter five, I explain how these diverse but contributory principles help to create a framework to inform the design of an intervention aiming to support the professional development of UNA teachers in the introduction of technology and POPP in their teaching practices.

2.1.7 Factors supporting or hindering professional development

In developing an effective professional development model it is important to consider factors that can contribute to the success (or not) of the program.

Caffarela and Zinn (1999) based on the work of Zinn (1997) identified four domains of factors that support or hinder professional development of academics': (1) people and interpersonal relationships, (2) institutional structures, (3) personal considerations and commitments, and (4) intellectual and psychosocial characteristics.

Four components of effective professional development in ICT Lloyd et al. (2005)	Guidelines to professional development. Lawler and King (2000)	Four principles of effective professional development Gallant (2000)	Eight considerations to address in professional development in ICT King (2003)
- Context: be relevant, practical and meaningful; have a direct and sustained impact, address teachers' immediate and ongoing needs. - Time: be timely, prolonged, ongoing and sustained; provide adequate time for participation, reflection and implementation. - Community: encourage sharing stories, experiences, and collaboration with colleagues, expanding professional and personal networks. - Personal growth: increase personal skills considering teachers' prior knowledge; enhance teachers' status within the learning community; support teachers' lifelong learning through reflection; allow teachers to take responsibility for their own learning.	- Consider the academics' needs, interests, experiences and capabilities. - Consider institution visions and needs. - Be tied to university reward systems. - Be delivered in a professional and appropriate way. - Emphasize practical applications and connections to academics' work. - Be aware of diverse learning styles, academics' discipline specific characteristics and academics' work constraints. - Support for changes in thinking and behavior. - Empower academics in their work. - Build a climate of respect and provide opportunities for collaboration and participation. - Provide opportunities to implement what is learned.	- Responsiveness: be responsive to the individuality of academics: their preferences for teaching and learning; prior experiences; attitudes toward change and innovation adoption. - Continuity: designed and offered on an ongoing, incremental, and cumulative basis. - Community: create a safe place to make errors, experiment, complain, tell success stories, and think reflectively. - Constructive Activity: academics should experience the teaching and learning conditions they plan to create for their own students.	- Contents should be pertinent and in accessible formats. - Make academics feel safe and respected. - Cultivate a respectful climate, scaffolding academics to learn technology based on their strengths. - Provide skills and strategies for academics to envision themselves as lifelong learners. - Provide learning experiences to discover and apply educational technology. - Seem as a bridge between technology and their academic expertise fields. - Link cooperative learning and practice (learning communities). - Consider individual academics' learning style, area of expertise and teaching style.

Table 2.1 Guidelines for professional development

Among the factors supporting professional development, in the domain of people and interpersonal relationships, they identified encouragement and support by colleagues at work as well as by family and friends, and positive relationships with chairpersons and administrators at work. In the domain of institutional structures, they include availability of time, funding, access to information and technology; and variety of opportunities for professional development on and off campus. For the domain of personal considerations and commitments, they point out factors regarding the private life of academics, such as support from family members and friends and the willingness of those to provide help in demanding situations of professional life. The domain of intellectual and psychosocial characteristics concerns the teachers' own motivation and perception of themselves as professionals; the supporting factors include self-confidence in their roles as academics, beliefs and values about academic excellence, enjoyment of challenges and change, and enthusiasm for continued professional development. The factors that can hinder professional development in each domain are a mirror of the supporting side, for example little confidence in their role as professional university teachers and reluctance to change are barriers in the domain of intellectual and psychosocial characteristics (Caffarella & Zinn, 1999; Zinn, 1997).

Mitchell and Geva (2009), relate the reluctance to change, in the context of adoption of online learning in higher education institutions, with four variables:

1. Intellectual reluctance: compatibility between the change and the academics' own beliefs, values and norms.
2. Support: perceptions that their efforts are valued by the institution and that there is support from departments and colleagues as well as resources, technical help, and training.
3. Change: perceptions of degree of instability caused by changes in their institution (structure, practices, and administrative systems), and to their specific job.
4. Cost-benefit: there must be a perceived need for the change, and a belief in the cost-benefit of the change.

According to the authors, these attitudes are inherently translated into behaviors that influence the level of resistance toward changes.

2.1.8 Professional development models

Professional development models have been changing over time. In their study about faculty development[2], Sorcinelli et al. (2006) traced five ages of academic development parallel to the evolution of the American and Canadian system of higher education:

- Age of Scholar (1950's – early 1960's): In this age, the higher education system was growing in importance and impact, and the efforts of academic development were focused on developing the competency of academics as content experts.
- Age of the Teacher (late 60's – 1970's): In this period, the system expanded to include faculty, instructional and organizational development. The focus of academic development was on teaching and curriculum development.
- Age of the Developer (1980's): In this phase, institutions were influenced by the reform agendas. The emphasis of academic development was in measuring the outcomes of teaching and faculty development efforts.
- Age of the Learner (1990's): In this age, the higher education system responded to distance education and technology instruction demands; the focus was to adjust academic teaching in order to address the needs of the new learners.
- Age of the Network (21st century): The emphasis in this age is on technology and its applications to teaching and learning. For the authors, this age poses the most exciting and dramatic challenges

It could be seen that from the 1970's to the 1990's, academic development efforts were focused on the individual, on improving academic skills to use technology. The models of professional development were event-driven; focus was on remedial and skills-training. The impact was concerned with individual, academic teaching practices. The 1990's provoked a shift of paradigm, highlighting the

2 Completed survey from 494 faculty developers at 300 U.S. institutions and 31 Canadian institutions

importance of academics' conceptual change in order to impact teaching practices. Academic development began to be viewed as part of an organizational change, as a tool for advancing organizational learning. "We believe that faculty development is a key strategic lever for ensuring institutional quality and supporting institutional change" (Sorcinelli et al., 2006, p.xi).

Regarding the Age of the Network, the authors consider three changing parameters: the changing academics body, the changing student body, and the changing nature of teaching, learning and scholarship. Within these parameters, their study identified seven issues as the most important to be addressed through professional development programs: teaching for student-centered learning; development of new academics; integrating technology into teaching and learning; active, inquiry-based, or problem-based learning approaches; assessment of student learning outcomes; multiculturalism and diversity related to teaching; and scholarship of teaching (Sorcinelli et al., 2006). Finally, they recommend that professional development must be aligned with the institution mission and should promote institution-wide dialogues; activities and workshops should be aligned with data and research, and professional development initiatives can use a "community organizing model". Another issue that seems very important to consider in an era where societies are becoming increasingly connected through globalization, are open opportunities for teachers to participate in global networks and professional communities. Globalization is characterized by increased connectedness, and it provides access to global knowledge, exchange of ideas, internal and external partnerships, and cross-cultural perspectives. It can create "new and hybrid forms of culture that articulate the local with the global" (Stromquist, 2002, p.2).

Universities respond with different approaches to the need of professional development for its academics, providing programs with different pedagogical perspectives, duration, content, mode of delivery and timing. Generally, participation in these programs is voluntary, but academics are encouraged to participate with diverse incentives, such as better position or salaries (Dept. of Education- Science and Training, 2002).

Sherman and Kutner (1998) identified four different approaches to professional development especially suited to adult education:

- Workshop/Presentation: acquisition of new skills and knowledge about a topic through participation in workshops,

conferences, seminars.

- Observation/Feedback: provides academics with mentoring, peer coaching, and supervision regarding their performance.
- Inquiry/Research: requires academics to reflect upon their daily practices in a systematic, intentional manner, through participating in study circles, action research, case studies, and curriculum writing.
- Product/Program Development: engages academics in processes such as curriculum development, program design and redesign, and program improvement.

The four approaches are not mutually exclusive; some of them require collaboration and others can be conducted individually or collaboratively. Some focus on the acquisition of new skills and others on the reflection on knowledge about teaching and learning processes.

In the same vein, Lloyd et al (2005) draw on Downes et al. (2002) to propose a list of models of effective professional development: Tertiary Study, School-based/focused Programs, Single Event Programs, Online Curriculum Projects, Serial Course in Hybrid Mode, Serial Course in F2F Mode, Professional Learning Communities and Action learning/Action research (p.6). They evaluated each of these models in terms of a series of impacts: direct impact on teaching practice, sustained impact on teaching practice, additions to personal knowledge of ICT integration, increased ICT skills, ability to reflect on practice, enhanced professional status, expanded professional networks and increased collaboration within the school. The results of the study point out professional learning communities as the model with the greatest overall impact. The authors argue that this high rating is due to the potential of learning communities to create "supportive environments for teachers seeking to develop their professional practice" (Lloyd et al., 2005, p.7)

According to Lock (2006), professional development initiatives have been organized as activities that do not consider the specific context of the teachers nor provide opportunities for reflective practice. She identified several aspects that influence the low impact of professional development programs in supporting teachers' change of practices: (a) one-shot and one-size-fits all workshops; (b) use of the transmission model from experts to teachers; (c) failure to address school-specific differences; (d) just-in-case training; and (e) system-wide presentations that do not provide sufficient time to plan or to learn new strategies to

meet the reality of their own classrooms (p.665).

In the last decades, the shortcomings identified in more conventional professional development models have provoked an interest towards community inspired models (Lock, 2006). Furthermore, the technological options currently available in educational institutions are creating possibilities for online and distributed learning environments that can facilitate and expand the professional development of the academics. Lock proposes three changes that, according to her, are necessary to develop online learning communities with the intention to foster professional development: (1) a shift in the academics' current perceptions about professional development, (2) provision of ongoing opportunities for professional growth of the academics based on their needs and within a learning community, and (3) those communities should include academics who share interests and goals in local and global contexts.

At this point, it is worth asking: Is the community approach important for the new professional development paradigm? Cross (1998) presents three reasons for using learning communities: "philo¬sophical (because learning communities fit into a changing philosophy of knowledge), research based (because learning communities fit with what research tells us about learning), and pragmatic (because learning communities work)" (p.4). In the same line of thought, DiPetta (1998) asserts as higher education changes dramatically in response to public calls for accountability, economic realities, and the rapid spread of technology, faculty need new ways of working together to prepare for and shape their professional futures. Community as an ideal combined with computer mediated communication technology can help redefine teaching, learning, research, service, and professional development in higher education (p.54).

Summary Section 2.1

The aim of this section was to review the literature about professional development in higher education. Literature says that academics should become knowledgeable about learning processes, diverse teaching strategies and their respective benefits. They also need to be prepared to use technology in multiple ways. Literature also highlights the importance of considering the values and beliefs of the teachers' as well as the learning principles of adults while designing professional development initiatives that aim to impact on teaching practices and to

produce the cultural change necessary at higher education level.

In the recent years, the concept of scholarship of teaching has been utilized as a way to transform teaching practices through a reflective process, through making teaching practices visible and open to discussion and analysis, and through a focus on the institutional structures, where professional development programs need to be considered as a tool for advancing institutional learning and not only the learning of individual teachers.

The review of guidelines for designing effective professional development programs, stresses the relevance of the community concept as well as learning centered approaches such as problem- and project based action learning as means for the learning and change of university teachers. In the next section, I will discuss a particular type of learning community, community of practice, as one approach to thinking about university teachers' professional development.

2.2 Communities of Practice

This section concentrates on the conceptual framework of communities of practice. As point of departure, the section explains the theoretical principles of communities of practice, the characteristics which define a community of practice and how to differentiate communities of practice from other social structures. Then, I discuss issues related to learning, participation and identity, all of them relevant in the context of this study. Later on, I will introduce the concepts of distributed communities of practice and how technology supports communication and participation in this kind of community. The section further identifies the principles that are conductive to cultivate, support and sustain communities of practice.

2.2.1 Theoretical underpinnings

The concept of communities of practice has existed for many years, however the term *community of practice* was coined by Lave and Wenger (1991) in their study about situated learning. The concept has gained increasing attention in the last years; it is based on the idea of learning as social participation, developed within the tradition of situated learning, meaning that situated learning provides a framework for understanding how learning occurs as a socio-cultural phenomenon.

In this paradigm, learning is conceptualized as a process of identity change within a network of social relationships rather than a process of transmission and assimilation of information (Brosnan & Burgess, 2003), thus learning is a socialization process through which identity is constructed by integrating formal knowledge with tacit or informal knowledge. Situated learning constitutes a shift from learning as an individual process towards learning as a process of participation and as a function of being a member of a community of learners (Barab & Duffy, 2000). This perspective emphasizes "the relational interdependency of agent and world, activity, meaning, cognition, learning, and knowing" (Lave & Wenger, 1991, p.50).

Wenger et al. (2002) define a community of practice as:

> *A group of people who interact, learn together, build relationships, and in the process develop a sense of belonging and mutual commitment. Having others who share your overall view of the domain and yet bring their individual perspectives on any given problem creates a social learning system that goes beyond the sum of its parts (p.34).*

In this perspective, learning is not considered as an individual and isolated enterprise, but is grounded in the daily activities and is intrinsically linked to the context in which knowledge is applied, hence learning is acquired through engagement in practice and through experience (Wenger, 1998).

In a community of practice, learning is distributed and transformed among members of the community with diverse expertise and through their action within it. Grounded in Trentin (2002), Wing Lai et al. (2006) summarize the assumptions of how learning takes place in a community of practice:

- Learning is fundamentally a social phenomenon.
- Knowledge is integrated in the life of communities that share values, beliefs, languages, and ways of doing things.
- The process of learning and the process of membership in a community of practice are inseparable.
- Knowledge is inseparable from practice.
- Empowerment – the ability to contribute to a community – creates the potential for learning. (p.11)

Besides situated learning, another important principle in communities of practice is reflective practice. Reflective practice is grounded in the assumption that knowledge is derived from the professionals' own experience as well from formal knowledge, and that each informs the other. The term reflective practice is commonly associated with Donald Schön (1987). He suggested that professional practice considers both technical skills and the art of practice, where technical skills are related with applying a set of rules to a well-defined problem with the assumption that there is one right answer, and the art of practice regards solving complex problems in situations that are unique or uncertain (Buysse et al., 2005). In a community of practice, meaningful reflections with other members of the community create opportunities to engage in the analysis of problems considering different perspectives, and consequently generating new knowledge through collaborative reflection, observation and discussion.

Along Wenger et al. (2002), other researchers have proposed similar definitions for communities of practice. For example Hara (2000 cited in Hara, 2004) defines communities of practice as "informal networks that support professional practitioners to develop a shared meaning and engage in knowledge building among the members" (p.11). In similar way, Barab et al. (2004) define communities of practice as "a persistent, sustained social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history and experiences focused on a common practice and/or mutual enterprise" (p.55). Both of these definitions use the term "network"; however the authors describe it as a concept of sharing. In other hand, Dirckinck-Holmfeld et al. (2009), emphasize the difference between networks and communities of practice. For them, networks are concerned with establishing connections and relationships, whereas communities of practice are concerned with the establishment of a shared practice. Their argument supports Wenger's position

Communities of practice could in fact be viewed as nodes of "strong ties" in interpersonal networks, but again the emphasis is different. What is of interest for me is not so much the nature of interpersonal relationships through which information flows as the nature of what is shared and learned and becomes a source of cohesion – that is, the structure and content of practice (1998, p.283)

For Henri and Pudelko (2003), communities of practice develop among people who are already members of a community of practice in the real world and who share the same working conditions. The challenge

for the community is then, to develop and enrich its professional practice through sharing common interests, knowledge, experience, concerns, and values.

2.2.2 Characteristics of a community of practice

Wenger (1998) defines a community of practice along three dimensions. These dimensions are a domain of knowledge that creates a common ground and sense of common identity, a community of people who care about the domain and create the social structure that facilitates learning through interactions and relationships with others, and a shared practice that the community shares, develops, and maintains to be effective in its domain.

Domain- What it is about?

Communities of practice have a defined area of knowledge and practice. This area of knowledge or domain motivates members to contribute and participate, guides members' learning and gives meaning to their actions (McDonald & Star, 2006). According to Wenger, members of a community of practice are connected because they are involved in making their enterprise "real and livable" (1998, p.79).

The domain establishes the common ground which gives members the motivation to meet, discuss and share. The domain contributes to define the identity of the members because being member of a community implies a commitment to the domain, a shared competence that distinguishes members from other people, and an interest in improve the practice within it. In a community of practice, members engage in joint activities, share solutions, stories, experiences and support each other. The participation in these activities and the relationships that they create enable members to learn from each other.

Although a community of practice needs that members engage in a common practice, homogeneity "is neither a requirement for, nor the result of, the development of a community of practice" (Wenger, 1998, p.76). Diversity of understandings allows members to contribute to the domain in complementary ways, however in order to decide what activities to pursue and to focus on issues that really matter, a kind of agreement is needed.

Community - How it functions?

A community of practice requires a community of people who

care about the domain. Each member brings different perspectives to the domain and the interest in this shared domain is what keeps members interacting with each other. The community as such comprises the network of communications, interactions, and relationships between members. Trust, mutual commitment, mutual respect, regular interactions and honesty encourage members to share ideas and insights, to expose their ignorance, to ask difficult questions, to critique practices (McDonald & Star, 2006), and to learn from each other.

Participation in a community of practice involves action and connection. It means taking part in conversations, in negotiation of meanings and in connection with others. It "combines doing, talking, thinking, feeling and belonging" (Wenger, 1998, p.56). And doing things together is not necessarily characterized by harmony and consensus, but by a complex mixture of power and dependency, pleasure and pain, expertise and helplessness, success and failure (Wenger, 1998, p.77)

Practice -What capability has it produced?

Members of a community of practice are practitioners, thus they have a set of resources including experiences, stories, tools and ways of solving problems. In a community of practice, members share these resources and contribute to the development of a shared repertoire of techniques, artifacts, tools, and language, which enable them to engage in, make meaning and refine their practice. The shared repertoire brings to the community a source of coherence; and over the time, it constitutes a material trace of the efforts of the community to be effective in the domain. The repertoire combines both reificative and participative aspects, including the discourses that shape the understanding of each member about the world, their practice and their membership identity (Wenger, 1998).

Structural components of communities of practice

According to Wenger (1998), it is the integration of the above three dimensions that differentiate communities of practice from other types of groupings such as communities of interest, networks, projects, communities of learners, teams and communities of inquiry.

Other researchers have also elaborated characteristics for communities of practice in order to distinguish them from other social structures. For example, for Johnson (2001) the components that distinguish communities of practice from traditional organizations and learning situations are: "(1) different levels of expertise that are

simultaneously present in the community of practice; (2) fluid peripheral to center movement that symbolizes the progression from being a novice to an expert; and (3) completely authentic tasks and communication" (p.45).

Similarly, Barab et al. (2004), grounded in a previous definition (Barab & Duffy, 2000), propose eight features that they argue are requisites for communities of practice:

> *(1) shared knowledge, values and beliefs; (2) overlapping history among members; (3) mutual interdependence; (4) mechanisms for reproduction, (5) a common practice and/ or mutual enterprise; (6) opportunities for interaction and participation; (7) meaningful relationships; and (8) respect for diverse perspectives and minority views (p.54).*

In their perspective, members of a community of practice identify themselves with a shared history and shared practices; and they form part of a whole that is continually evolving as members move from the periphery to the center of the community.

Wenger et al. (2002) describe several types of communities of practice. They can be small or big, have a short or long life. Their membership can be homogenous or heterogeneous; they can emerge spontaneously or be intentionally developed. Communities of practice can be collocated or distributed, and they can exist within a specific business unit, or across several business units, and even across organizational boundaries. A community of practice can have different kinds of relationship with the institution in which it is bounded, from invisible to institutionalized (official status), and within this range, they can be visible to a group of people (bootlegged), officially declared as valuable entity (legitimized), or even supported by resources from the institution (supported). Each kind of relationship entails different challenges for the community and the institution (Wenger et al., 2002).

To get a better understanding about what is and what is not a community of practice. In the next section, I will explain the main differences among communities of practice and other social structures such as communities of interest; goal-oriented communities; learners' communities; communities of purpose; knowledge-based communities and quasi-communities.

2.2.3 Identifying communities of practice

The term community is widely used in the literature about education. Broadly speaking, communities are social structures that enable people to share knowledge, experiences, stories and resources in support of collaborative action. Terms such as community of interest (Fischer, 2001; Henri & Pudelko, 2003), goal-oriented community (Henri & Pudelko, 2003), community of learners (Buysse et al., 2005; Henri & Pudelko, 2003), task-based communities (Riel & Polin, 2004), knowledge-based communities (Riel & Polin, 2004), learning communities (Rodríguez Illera, 2007), communities of purpose (Barab et al., 2004; Schlager & Fusco, 2004), quasi-communities (Hung & Nichani, 2002), practice-based learning communities (Riel & Polin, 2004) and projects, teams and practice fields (Barab & Duffy, 2000; Johnson, 2001) are sometimes used interchangeably with communities of practice and, even in some cases, the same term is used with different connotations. I consider it important to distinguish the different forms of communities because each one develops according to different goals and strategies, require different social and technological support, the process of negotiation of meaning is different, as well as the learning that takes place within them. Table 2.2 characterizes and differentiates these social structures along a number of dimensions.

Not every community is a community of practice. Wenger et al. (2002), propose that the terms community + practice refer to "a very specific type of social structure with a very specific purpose" (p.41). One of the main differences between communities of practice and the other groupings is that communities of practice are about a shared enterprise. Members of a community of practice are "informally bound by what they do together" (Wenger, 1998, p.2), they interact and learn together by engaging in joint activities around their shared domain of interest (Gray, 2004). The existence of these common situations, problems and perspectives is what really allows members of a community of practice to share knowledge and to learn from each other. Communities of practice are also different in their purpose and in their life span; they have a life cycle in contrast with many of the other groupings. Communities of practice, as well as many of the other social structures, are learning communities, but the learning that takes place is oriented to the transformation of the members' identity within the practice. In the following, I will describe in more detail the different communities, in order to clarify what distinguishes them from communities of practice.

	What is the context of emergence?	What is the purpose?	What kind of learning?	How long do they last?	Who belongs?	What holds them together?
Community of interest (Henri & Pudelko,2003; Wenger et al., 2002)	Gathering around a common topic of interest	Information exchange	Knowledge construction for individual use	As long as people have a reason to connect and share information	Everyone interested in the topic	Access to information and sense of like mindedness
Goal- oriented community of interest (Henri & Pudelko, 2003) / **Project Teams, Task Forces, Formal Work Teams** (Wenger et al., 2002) / **Task-based learning communities** (Riel & Polin, 2004) **Community of interest** (Fischer, 2001)	Created to carry out a specific mandate	Sharing of diverse perspectives and production of objects commissioned by mandate	Knowledge construction from diverse knowledge systems towards collective use	Until the project or task has been completed	Everyone who has been assigned to the team	Shared responsibility for the task
Learner's community (Henri & Pudelko, 2003)	Pedagogical activity proposed by the instructor	Participation in the realization of a collective project	Knowledge construction by carrying out socially situated activities	Until the end of the educational program	Participants in the educational program	Shared responsibility for the project
Knowledge-based learning communities (Riel & Polin, 2004)	Gathering to advance the collective knowledge in a subject or field of inquiry	Deliberate and formal production of external knowledge about the practice	Knowledge construction by the intentional development of reusable knowledge	As long as experts have an interest in advance and develop the field	Membership is defined by credentials as knowledge builders	Commitment, and identification with the development of the field
Communities of purpose (Schlager & Fusco, 2004)	Gathering around a shared goal or purpose	Going through the same process or trying to achieve a similar objective	Knowledge construction from diverse knowledge systems towards accomplishment of a specific purpose	The time required to accomplish the objective	People who have a direct role in accomplishing the goal	Commitment to the goal

	What is the context of emergence?	What is the purpose?	What kind of learning?	How long do they last?	Who belongs?	What holds them together?
Informal Networks (Wenger et al., 2002) / **Quasi-communities** (Hung & Nichani, 2002)	Gathering to share information and building relationships	Collecting and sharing information of common interest	Knowledge construction for individual use	As long as people keep in touch or remember each other	Everyone interested in the topic	Mutual need and relationships
Networks of practice (Brown & Duguid, 2000)	Gathering around a common practice	Refinement of one knowledge system; new ideas coming from within the practice	Knowledge exchange from diverse knowledge systems	As long as people have a reason to connect and share information	Members of the network who share a common practice	Sustained engagement
Community of practice (Henri & Pudelko, 2003; Wenger et al., 2002) / **Practice-based learning communities** (Riel & Polin, 2004)	Stems from a existing, real community of practice	Professional practice development through sharing knowledge among members	Appropriation of new practices and development of involvement	As long as members have an interest in improving the practice and maintaining the community	Self selection based on expertise or passion for a topic	Passion, commitment, and identification with the group and its expertise

Table 2.2 Communities of practice and other groupings: differences and similarities. Sources: (Wenger et al., 2002, p.42,Table 2-2); (Henri & Pudelko, 2003, p.485, Table 1), (Riel & Polin, 2004) and (Fischer et al., 2007, p.14, Table 1)

Community of interest

In a community of interest (Henri & Pudelko, 2003), a group of people gather around a subject of common interest, they exchange ideas, information and thoughts about the subject, look for answers to problems or questions, but may know little about each other. As they do not have a collective enterprise, they do not expect and do not feel responsible for sharing their individual knowledge, and the learning that takes place from their participation in the community is more personal than collective. In a community of interest, the members identify more with the subject of interest than with its members (Henri & Pudelko, 2003). These communities have a variable lifespan; some may have a short life while others last for years.

Goal-oriented communities of interest, task-based learning communities, task forces and project teams

Goal-oriented communities of interest (Henri & Pudelko, 2003), community of interest (Fischer, 2001), task-based learning communities (Riel & Polin, 2004), task forces and project teams (Wenger et al., 2002) are groupings with a specific mandate. They are characterized by their shared interest in solving a particular problem, defining or carrying out a project. Members of these kind of communities are individuals (from different communities of practice) with different experiences, competences, interests and perspectives about problems and use different knowledge systems in their work (Fischer, 2001). The lifespan of these communities is fixed; they begin in the context of a specific project and dissolve when the project ends.

Community of learners

Henri and Pudelko (2004) define a community of learners as a group of students whose tutor wish to induce them into a "learning process based on action, resulting in a project and scaffolded on collaboration between learners" (p.481). In this perspective, this kind of community strongly depends on the tutor, and it has a formal and explicit goal of learning. This learning is guided by the tutor and linked to a curriculum program, thus it is different from the learning that takes place in other forms of communities. The learners' community is temporary; it begins and ends in accordance with the educational program.

Knowledge-based learning community

The focus of a knowledge-based learning community is the "deliberate and formal production of external knowledge about the practice" (Riel & Polin, 2004, p.21). This kind of community resembles a community of practice but with the intentional development of experts within the community. Members seek to advance the collective knowledge in a specific field, supporting the growth of each one in the community. As well as other learning communities, the knowledge-based learning community exists within organizations and its aim is to codify knowledge and make it available for evolution.

Community of purpose

A community of purpose is a group of people engaged in prescribed, highly structured activities to accomplish specific learning objectives (Schlager & Fusco, 2004). Members of a community of purpose could come from different backgrounds and experiences but share with each other a set of values, norms, and perspectives that apply in achieving the objective. The life span of these communities is usually limited to the time required to accomplish the objective.

Quasi-communities

Hung and Nichani (2002) define quasi-communities as "loose communities in which most members are unknown to each other, and participation is based on specific needs and demands" (p.25). This definition resembles the concepts of informal networks (Wenger et al., 2002), because in both of them, binding ties are weak, and participants contribute because they receive some personal benefit. Learning is not explicitly intended to occur, but can result as a by-product.

Networks of practice

Duguid (2005) defines a network of practice as "the collective of all practitioners of a particular practice" (p.10). In a network of practice - as in communities of practice – the members share a common practice. However, while in communities of practice the members have an implicit responsibility for the reproduction of their community and practice, in a network of practice the common practice is just a reference for the members' interaction. This interaction allow them to share information in an effective way, but there is little reciprocity among the members (Duguid, 2005). Another difference is that communities of practice are usually found inside organizations, while networks of practice often extend across organizational boundaries (Fischer et al., 2007).

Learning communities

Communities of practice are often categorized as learning communities (Barab & Duffy, 2000; Buysse et al., 2005; Cousin & Deepwell, 2005; Gray, 2004; Hara, 2004; Palloff & Pratt, 2005; Riel & Polin, 2004; Schlager & Fusco, 2004; Tu & Corry, 2002). Fulton and Riel (2005) define a learning community "as a group of people

who share a common interest in a topic or area, a particular form of discourse about their phenomena, tools and sense-making approaches for building collaborative knowledge, and valued activities". Riel and Polin (2004) suggest that there are three types of learning communities, which are intentionally designed to support learning: (1) task-based learning communities – similar to teams or project groups; (2) practice-based learning communities – similar to Wenger's (1998) definition of a community of practice; and (3) knowledge-based communities with focus on the production of external knowledge. However, Rodríguez Illera (2007) stresses the differences between learning communities and communities of practice. He points out that when the learning community is bounded in educational settings, the educational influence is explicit and drives the definition of theoretical approaches and learning objectives, conversely communities of practice are not purposefully educational, learning is implicit and tacit, it occurs through practice.

Barab and Duffy (2000) argue that what distinguishes communities of practice from concepts such as communities of learners, communities of inquiry and knowledge building communities is the 'development of self through participation in a community' (p.35, italics in the original). They indicate that these 'community' efforts are focused on practice fields rather than on the learner's connections and participation in practice communities. For them, practice fields are the settings in which learners apply new knowledge, and practice the kinds of activities they will face outside the schools whereas the participation in communities of practice gives opportunities for regular reflection and dialogue with people with diverse levels of expertise, thus the development of the self is mediated by legitimate participation as part of a community. Both communities of practice and practice fields involve learning authentic content by solving authentic problems but practice fields separate the authentic content from the real situation (Johnson, 2001).

Each type of community presented above has a particular focus and purpose that best defines it. The social context in which these communities emerge and evolve is diverse, as well as the relationships and ties among their members. The participation of the members is also different and consequently the learning that takes place in each social structure. However, according to Henri and Pudelko (2003), occasionally, some of these parameters can evolve in the time-span of a community producing a transition from one kind of community into another.

2.2.4 Learning and participation in a community of practice

Wenger's social theory of learning encompasses four components: (1) meaning: learning as experience; (2) practice: learning as doing; (3) community: learning as belonging; and (4) identity: learning as becoming (1998). In his perspective, learning is a process of social participation. It is a practice of identity formation and modes of belonging, and not just accumulating skills and information. To Wenger (1998), the basic principle is that learning is more than having knowledge and obtaining certain competences, learning makes people who they are and creates personal histories of becoming a kind of person in the society. Similarly, Jarvis (2003) argues that learning is the process of transforming experiences into knowledge, skills, attitudes, values, beliefs and emotions.

A social understanding of learning presumes an understanding of practice as socially situated within a specific setting. Learning occurs from the participation in the practice of a specific community, and belonging to a community of practice enables members to construct the meaning of that practice. Over time the members move from the periphery to the center of the practice. The motivation to become a more central participant in a community of practice can provide a powerful incentive for learning.

Wenger (1998) defines learning as follows: for individuals, learning is a way of engaging in, and contributing to, the practices of their communities. For communities, learning is a way of refining its distinctive practices and ensuring new generations of members; and for organizations, learning is an issue of sustaining interconnected communities of practice, which define what an organization knows and contribute as an organization (p.7-8).

Learning as an experience of identity, entails both a process and a place,

> *It entails a process of transforming knowledge as well as a context in which to define an identity of participation. As a consequence, to support learning is not only to support the process of acquiring knowledge but also to offer a place where new ways of knowing can be realized in the form of such an identity [...] the transformative practice of a learning community offers an ideal context for developing new understandings because the community sustains change as part of an identity of participation (Wenger, 1998, p.215).*

2.2.5 Identity in a community of practice

There is a close relationship between identity and practice. Wenger (1998, p.149) identifies five parallels between practice and identity:

- As negotiated experiences where we define who we are by the ways we experience ourselves through participation as well as the way in which we and others reify ourselves.
- As community membership where we define who we are by the familiar and the unfamiliar;
- As learning trajectory where we define who we are by where we have been and where we are going;
- As nexus of multi-membership where we define who we are by the ways we reconcile our various forms of identity into one identity; and
- As a relation between the local and the global where we define who we are by negotiating local ways of belonging to broader constellations and manifesting broader styles and discourses

Identity as negotiated experience: Participation in a practice gives members identities as practitioners in that practice. Members define themselves by both the way in which they participate in their practice and by the way in which other members view their participation in the practice. Identity is thus, "a layering of events of participation and reification by which our experience and its social interpretation inform each other [...] identity as a very complex interweaving of participative experiences and reificative projections" (Wenger, 1998, p.151)

Identity as community membership: Being part of a community requires members to learn how to use and interpret the community repertoire of practice: artifacts, language, rituals, rules and conventions. In order to be competent, members need to feel familiar with the territory of the community and to be recognized as full members by the others (Wenger, 1998). Hence, being competent means being able to engage with others, and making use of and contributing to the development of the community's shared repertoire. Sustained engagement in practice provides members with opportunities to learn and apply the repertoire of the practice, as well as to learn the ways to work with and engage with other members.

Identity as learning trajectory: Identity is an ongoing work that extends in time. As members of a community of practice participate within the community, their identities form trajectories. A trajectory

has " a coherence through time that connects the past, the present and the future" (Wenger, 1998, p.154). In the context of communities of practice, Wenger identifies various types of trajectories. Members with a peripheral trajectory can never become full participants, however their level of access to the shared repertoire allows them to contribute peripherally and this contribution may shape their identity. Inbound trajectory suggests that newcomers to the practice have their identities invested in moving towards full participation in the future. Members with insider trajectories are full participants seeking new ways of defining new practices and in this process renegotiate their identities. Boundary trajectories enable linkage between different communities of practice. Some members of the community undertake the role of brokers establishing and promoting interaction and links between multiple communities of practice. Members with outbound trajectories are in the process of leaving the community, they are willing to develop new relationships and look for other communities of practice.

Identity as nexus of multi-membership: Members of a community of practice belong to more than one community of practice, and engage in different practices with different levels of participation and trajectories, thus they need to reconcile their identity as an expression of this multi-membership. This negotiation may be successful or be source of struggle as members work to reconcile their diverse forms of participation.

Identity as a relation between the local and the global: Communities of practice are connected to broader rich and complex contexts. Members of the community refine their identity in relation to these social relationships. "Identity in practice is therefore always an interplay between the local and the global" (Wenger, 1998, p.162).

To sum up, identity entails an integration of experience and its social interpretation. Identity evolves both through our participation and non-participation in all the communities with which we interact. All the experiences we have with these communities contribute to our learning and to the construction of identity (Kirkup, 2002).

2.2.6 Distributed communities of practice

The evolution of Internet and Web technologies has impacted on the way in which individuals communicate and, at the same time, has provided opportunities for distributed and online communities of practice, facilitating the creation and sharing of knowledge, expertise and experiences between individuals.

Wenger et al. (2002) define a distributed community of practice as "any community that cannot rely on face-to-face meetings and

interactions as its primary vehicle for connecting members" (p.115). In the literature, the terms virtual, online and distributed are sometimes indistinctly used, however, for this study, I use the term distributed because it entails different kinds of connections between community members, including face-to-face and online or virtual communication.

Distributed communities of practice can be formed for members coming from different places, organizations, states and countries resulting in a richer community, but also a community exposed to a greater variety of perspectives. According to Wenger et al. (2002), cultivating and sustaining distributed communities of practice is significantly more difficult than sustaining co-located communities. Communication in distributed communities of practice partially relies on technology, thus technology infrastructures must help to overcome barriers that do not occur in co-located communities of practice, such as visibility and presence, size, affiliation, priorities, and cultural differences (Barab et al., 2004; Wenger et al., 2002). In addition, distributed communities of practice usually need a more formalized structure to organize activities that would enable doing, becoming, experience and belonging for the members. Furthermore, designing distributed communities of practice also require an understanding of social and organizational issues (Schlager et al., 2002).

Growth and evolution of a community of practice relies on the effective communication between members. In a distributed community of practice, members do not necessarily share work contexts, nor are they geographically proximate, so it becomes more difficult to share the knowledge and consequently the evolution of the community. The casual conversations and informal discussions that physical proximity promotes are the most difficult to create in a distributed community of practice (Hinds & Weisband, 2003). In a co-located community, shared experiences and communication are easy goals to achieve, but when members need to make a special effort in order to connect to the community, the participation can be less frequent, increasing the inertia in the community. This inertia needs to be overcome for the community, making the delivery of tangible value for its members even more important (Wenger et al., 2002).

Co-located and distributed communities of practice, share many characteristics; both are learning communities where members are mutually engaged in a joint enterprise, creating a repertoire of communal resources with the aim of developing their professional practice. However distributed communities of practice can primarily be supported by information and communication technologies, so, operationally, they are different from co-located communities. Wing Lai et al (2006, p.15) describe aspects in which co-located and on-line

communities differ:

- Design: Online communities of practice are usually designed top-down, while co-located communities of practice usually emerge from existing groups.
- Membership: Online communities of practice are usually open; co-located communities of practice are usually closed.
- Leadership: Leaders of online communities of practice are recruited, while leaders in collocated communities of practice may emerge from the community.
- Form of communication: In online communities of practice, communication is primarily computer-mediated, while in co-located communities of practice, communication is primarily face-to-face.
- Time to develop the community: It takes longer to develop an online community of practice than a co-located community of practice.
- Technological support: This is essential for online communities of practice but not for collocated communities of practice.

The above distinctions also apply to distributed communities of practice because this kind of community need the support of technology infrastructure and usually need to deal with issues of time, size and affiliation (Wenger et al., 2002) that are not always present in co-located communities as members can work in the same organization.

There is an ongoing debate about whether or not communities of practice can be partially or completely online. According to Wing et al. (2006), there are several issues that researchers question about online communities of practice, such as whether virtual environments can support the development of relationship and trust (Eraut, 2001; Nichani & Hung, 2002); whether tacit knowledge can be transferred in online settings (Davenport, 2001), whether practice-based communities can be situated in a virtual space (Lueg, 2000), and how to facilitate participation (Hildreth, Kimble, & Wright, 2000).

Among others, distributed and online communities of practice face the challenge of building trust between its members,

Trust is the glue that binds the members of a community to act in sharing and adapting manner. Without trust, members would hoard their knowledge and experience and would not go through the trouble of sharing with or learning from others (Nichani & Hung, 2002, p.51).

According to these authors, trust between members of a community of practice takes time to develop and depends on the existing levels of trust in the context where the community is embedded. Online communication can only strengthen existing co-located communities of practices (Hara & Kling, 2002). In a paper titled Where is the Action in Virtual Communities of Practice?, Lueg (2000) questions whether learning and doing can take place in an online environment and what kind of shared activities qualify as shared practice in the sense of communities of practice. He argues that communities of practice have to be local, not distributed.

Other researches, such as Pallof and Pratt (2005), Hildreth et al. (2000), Schlager and Fusco (2004), Nett (2008), Barab et al. (2004), Riel and Polin (2004), Squire and Johnson (2000), and Wenger et al. (2002), acknowledge that even when it is a more difficult challenge, distributed communities of practice can be successfully implemented, but they have to be carefully designed. In distributed and online communities of practice, it is harder to achieve trust among members, and even when a common language is used, it cannot be assumed that practices and contexts are the same in the different localities (Campbell & Uys; Hinds & Weisband, 2003; Wenger et al., 2002). Furthermore, the online network must be able to support the "subtle cultural mechanisms that shape interaction, identity and access" in co-located communities (Riel & Polin, 2004, p.32). As Di Petta (1998) states, "community in virtual environments is something that we must choose and work to create" (p.64)

As not any group of people constitutes a community of practice, it also applies that not all groups of people in a web environment is a distributed community of practice. The mere "exchange of words and ideas through the mediation of computer bulletin boards and networks" (Preece, 2001), does not turn a group into a community. The three fundamental components of communities of practice: domain, practice and community (Wenger, 1998) must also be present in distributed communities of practice. Online congregations as bulletin boards, list servers, UseNet News, interest groups, online groups, portals and blogs are not distributed communities of practice.

2.2.7 The role of technology in supporting distributed communities of practice

As I have discussed before, the role of technology in distributed communities of practice is fundamental. Communication and participation are central to the evolution of a distributed community of practice, and technology is essential in supporting the creation of

the relationships that help to build the trust and identity that define a community. Furthermore, technology should provide functionalities to support both learning and socialization (Preece, 2000). To use the potential of technology for professional development in communities of practice, a purposeful selection of technology with the consideration of effective adults learning pedagogies is necessary (Lock, 2006). As Wenger et al. state "good technology in itself will not make a community, but bad technology can sure make community life difficult enough to ruin it"; technology should contribute to creating a sense of togetherness for the members, in a way that they can feel they belong to the distributed community (Wenger, White, Smith, & Rowe, 2005, p.9).

Technology must support the goals, activities and needs of the community. It can contribute to cultivating the community of practice, in several ways: connecting members, supporting team work, building knowledge repositories, building a sense of community, encouraging participation, fostering identity and presence, mentoring and online instruction (Wing Lai et al., 2006). Moreover, ideally, the technology platform should be easy to learn and use (Preece, 2000; Wenger, 2001), easily integrated with software that members regularly use in their daily tasks (Schlager & Fusco, 2004; Wenger et al., 2005), reliable and flexible (Lock, 2006), and not too expensive (Wenger et al., 2005).

2.2.8 Cultivating a community of practice: Design principles

There is an ongoing debate among researchers on whether a community of practice can or cannot be designed. Many researchers (Barab et al., 2004; Brown & Duguid, 2000; Moule, 2006; Rodríguez Illera, 2007; Schlager & Fusco, 2004; Sherer et al., 2003; Wenger et al., 2002) support the argument that a community of practice cannot be created by mandate, yet they can be cultivated. Organizations and educational institutions can influence their development providing the social and technical infrastructure for the community to grow.

In designing a community of practice it is fundamental to create the interaction, collaboration and interdependencies that make communities *alive*.

> *Because communities of practice are voluntary, what makes them successful over time is their ability to generate enough excitement, relevance, and value to attract and engage members. Although many factors, such as management support or an urgent problem, can inspire a community, nothing can substitute for this sense of aliveness (Wenger et al., 2002, p.50).*

In designing a successful community of practice, it is necessary to consider pedagogical, technological and organizational issues (Hara & Kling, 2002). shows four different groups of principles or guidelines to design communities of practices, whether co-located or distributed.

While all the perspectives are diverse, they also contribute to each other. The first two columns (Le Moult, 2002; Wenger et al., 2002) correspond to guidelines that were developed mainly through consultative work and are focused in organizational communities of practice, yet applicable to all communities whether online or offline. The third column (Cambridge et al., 1995) correspond to guidelines based on the shared experience of several educational organizations, nonprofits, associations and government organizations working together. The last group of guidelines (Wing Lai et al., 2006) was developed as a result of a literature review and synthesis in order to inform the Ministry of Education of New Zealand on how to develop, implement, and maintain online communities of practice for professional development of teachers.

Summary of section 2.2

The integration of the fundamental elements of domain, community and practice is what characterize a community of practice. In a community of practice, members are involved in a set of relationships over time. The fact that they engage in a specific domain of knowledge give members a sense of joint enterprise and identity. In pursuing their enterprise, the community generates a shared repertoire of tools, routines and languages that, in some way, represent the accumulated knowledge of the community.

It has been established that, in communities of practice, learning is a matter of experience, doing, belonging and becoming. It is a process of identity formation and not just an accumulation of skills and information.

While communities of practice develop naturally, a careful design can foster their evolution and sustain their growth. Networked technologies can provide the evolution of distributed communities of practice reducing space and time barriers. However, issues such as trust, presence and social relationships represent a major challenge for these kinds of communities.

In the next section, I will discuss how the project-oriented problem pedagogy approach can be used to foster the emergence of a community of practice.

Ten tricks to successfully manage a CoP (Le Moult, 2002)	Seven principles to guide CoPs (Wenger et al., 2002)	A Step-by-Step Guide for Designing & Cultivating CoPs in Higher Education (Cambridge, Kaplan, & Suter, 1995)	Design principles for effective online CoPs (Wing Lai et al., 2006)
• Actively generate content Do not be too strict in judging • Create executive awareness • Use your own personal network • Support the snowball principle • Provoke voluntaries • Keep it simple • Keep it fresh (first in community) • Let it grow before structuring • Rely on the fun factor	• Design for evolution • Open a dialogue between inside and outside perspectives • Invite different levels of participation • Develop both public and private community spaces • Focus on value • Combine familiarity and excitement • Create a rhythm for the community	• Inquire: identify the audience, purpose, goals, and vision • Design: define the activities, technologies, group processes, and roles • Prototype: pilot the community with a selected group of key stakeholders • Launch: roll out the community to a broader audience over a period of time • Grow: engage members in collaborative learning and knowledge sharing activities • Sustain: cultivate and assess the learning, knowledge, and products created by the community	• Cultivated to grow naturally • Support sociability and participation • Attract a diverse membership • Provide different roles. • Include technology designed with functionality to support sociability and knowledge sharing. • Provide a blended approach where online activities are supported by offline activities.

Table 2.3 Communities of practice: design principles and guidelines

2.3 Communities of Practice and Project-Oriented Problem Pedagogy

As introduced in section 2.1.4, project-oriented problem pedagogy (POPP) builds on principles of collaboration, learning through and while producing, joint project work, shared meaning construction and object orientation (Dirckinck-Holmfeld et al., 2009). In POPP, the learning is situated and meaning is created from the real activities of daily living and working, and knowledge is created in and through working together with a common purpose (von Kotze, 2003).

In the design of a flexible professional development environment for teachers that supports collaborative knowledge building through dialogue, participation and negotiation of meanings, POPP can provide opportunities for teachers to work together; acknowledging their personal values, beliefs and experiences; and expanding their knowledge and skills as they engage in learning more about problems related to their own practices. This dynamic allows teachers to integrate their professional practices with their professional development.

POPP requires that the participants in the learning environment engage in a shared enterprise through the process of problem formulation and solution, and develop a shared repertoire of actions and discussions. Each participant brings a variety of skills and experience to accomplishing their shared goal; therefore, there are multiple ways to participate. The participants' roles and responsibilities can vary between central and peripheral participation based on their degree of knowledge, interests, and experience with a particular problem and project. In this perspective, the learning process is a transformation of the participant who is moving toward full membership in the community (Wenger, 1998).

Referring to the postgraduate study program for professionals, MIL -Masters program in ICT and Learning,- which is based on a networked version of POPP, Dirckinck-Holmfeld et al (2009) asserted:

The model enhances the opportunities to develop a community of practice because it is adaptable to the engagements of the participants, while at the same time it creates interdependencies among them. Furthermore; it also supports the individual's construction of meaning through the construction of shared understanding, and through negotiations, confrontations and engagement in relation to the long-term development and change of (professional) identity.

According to Wenger (1998), a community of practice is constituted by mutual engagement, joint enterprise and a shared repertoire. In the context of a project-oriented problem pedagogy approach, to build

this sense of community, participants must be engaged in the learning processes. They must assume ownership of the problem and of the development of a resolution (Dirckinck-Holmfeld, 2002). Furthermore, the fact that participants are organizing around a project gives them a sense of joint enterprise and identity. Working together, participants develop individual knowledge from their interactions with others as they construct knowledge.

Given the above discussed characteristics and its learning dynamic, POPP could be considered a vehicle for the development of inter-dependencies among university teachers, continuous professional development processes, and development of communities of practices (Coto & Dirckinck-Holmfeld, 2007; Dirckinck-Holmfeld et al., 2009). In the context of this study, the POPP pedagogical perspective will inform the pedagogical design of the intervention, and together with the contributing principles of effective professional development and communities of practice, it will form the conceptual framework supporting the educational intervention explored in this research.

Summary section 2.3

The purpose of this section was to argue that the pedagogical principles of POPP, such as problem orientation, collaboration, construction, relationships, shared enterprise, flexibility, open-ended conversations, negotiation and inter-dependencies, can contribute to foster a productive community of practice among university teachers. Indeed, POPP may serve as an organizing pedagogical model for continuous professional development (Dirckinck-Holmfeld, 2002) within the framework of a community of practice.

The next section explores the concept of communities of practice as means to support professional development of teachers at university level.

2.4 Communities of Practice as a Model of Professional Development

The need to redefine and revitalize teaching and learning processes in higher education and to support university teachers in that process, has been established in the previous sections. In this part, I examine the extent to which the concept of communities of practice can inform the professional development of university teachers.

As I have presented in section 2.1.2, professional development means more than development of skills. In our knowledge society, it is clear that professional development needs to engage university teachers

in change of beliefs, principles and pedagogy (Gibbs & Coffey, 2004; Kember & Kwan, 2000; Light & Calkins, 2008; Putnam & Borko, 2000; Smyth, 2003).

Traditional professional development (event-based, one-hit training workshops) is criticized for being fragmented, unrelated to classroom practice and for lacking follow-up activities. This 'one shot' delivery model has been shown ineffective in impacting on teaching practice, and according to Schlager and Fusco (2004), this is because it has focused on providing teachers with "information about a practice rather than on how to put that knowledge into practice" (p.120). In their opinion, a community of practice can play an integral role in teacher professional development, which they define as "a process of learning how to put knowledge into practice through engagement in practice within a community of practitioners" (p.124, emphasis in original). In other words, professional development entails engagement, interactions and practice with others with similar professional interests (Lave & Wenger, 1991).

To shift from the transmission model to a community model in professional development requires a different focus on how we understand university teachers' learning. The new approach should foster a culture of sharing among teachers and provide knowledge networks for them while they reflect on beliefs and practices (Barab, Thomas, & Merril, 2001). Being part of a community enable teachers to articulate their understandings about different problems, and to examine them from multiple perspectives.

Literature on professional development reminds us of the importance of considering theories of adult learning in designing, planning and delivering professional development initiatives for university teachers (Cranton & King, 2003; Gallant, 2000; Jarvis, 2003; King, 2003; Lawler & King, 2001, 2003; Wlodkowski, 2003). This perspective places an emphasis on the individual learning needs of academics regarding the new demands on professional skills and teaching strategies, and suggests that academics must become life-long learners themselves.

On the other hand, the concept of a scholarship of teaching is becoming more relevant in the context of professional development (Andresen, 2000; Caffarella & Zinn, 1999; Healey, 2000; Laurillard, 2002; Lueddeke, 2003; Sorcinelli et al., 2006; Taylor, 2009; Trigwell, Martin, Benjamin, & Prosser, 2000). The scholarship of teaching attempts to bring a research approach to teaching, integrating both components. It implies making educational processes more visible and public than they have typically been in universities, and consequently

opening opportunities for colleagues to discuss those processes and learn from each other about practices that are effective in enhancing learning (Laurillard, 2002).

2.4.1 How is the concept of communities of practice relevant to professional development?

According to Wenger and Snyder (2000), communities of practice, in organizational contexts, are an effective means to: (1) help drive strategy, (2) start new lines of business, (3) solve problems easily, (4) help to transfer best practices, (5) effectively develop professional skills, and (6) help organizations recruit and retain talent. If we translate these features to educational institutions like universities, it becomes clear that communities of practice can be successful as a framework to professional development grounded on adult learning principles and able to support the fundamental principles of the scholarship of teaching. Within a community of practice, academics can renew and learn new pedagogical strategies, improving their practices, reflecting on the process and sharing their educational experiences with colleagues and with the academic community in general. Whether these communities are supported by the institution, an ongoing transforming culture can take place.

Wing Lai et al. (2006) summarize the characteristics of effective communities of practice for teachers' professional development:

- Learning in communities of practice is situated and authentic.
- Communities of practice can facilitate teacher reflection.
- Communities of practice help change instructional practice and strategies.
- Communities of practice can support change of beliefs and attitudes towards teaching.
- Communities of practice facilitate knowledge creation and sharing best practice.
- Communities of practice change the role of teachers to co-learners.
- Communities of practice facilitate identity building.
- Communities of practice reduce teacher isolation.
- Teachers are satisfied with this form of professional

development. (p.24-26)

By using a community of practice framework to develop professional development programs, we provide academics with opportunities for collaboration, co-construction of knowledge and professional inquiry. The community of practice perspective brings a learning environment where academics are invited to participate and reflect about the meanings of teaching and learning together with other academics who share the same interest in improving their practice.

A model of community of practice for professional development recognizes the need for academics to explore their practices and consequently their professional identities. University teachers who want to transform their practices need to engage with other teachers in mutual and negotiable ways, and they need support to shift their trajectories from the periphery to the center. Furthermore, distributed communities of practice assist dealing with the well-known problems of teaching schedules and time demands that limit the opportunities for face-to-face events.

To conclude, as Wenger (1998) argues "there is a profound connection between identity and practice" (p.149). Academics have multiple professional identities, as practitioners and experts in their fields, as researches and as teachers, among others. Their identities are produced in complex relationships among those practices. Communities of practice can provide the context and conditions for teachers to develop their identities individually and collectively (Sachs, 2001). "A good way to develop identities is to open a set of trajectories that lead to possible futures" (Wenger, 2004, p.254), and through imagination and alignment it becomes possible to envision potential futures and which means to get there. Identity and learning are inseparable (Kirkup, 2002). Learning within a community of practice provides teachers with new ways of being and understanding, "one needs an identity of participation in order to learn, yet needs to learn in order to acquire an identity of participation" (Wenger, 1998, p.277)

2.4.2 Challenges and barriers

In designing distributed communities of practice for professional development, it is important to be aware of limitations that may arise and hinder its potential benefits. Lock (2006) discusses four reasons that have been identified in the literature as obstacles for successful online communities for professional development: technology, learner readiness, school culture, and quality of professional development (Eib,

2002; Killion, 2000; Schlager et al., 2002).

- The instability of the technological infrastructure while teachers participate in the online activities can become an obstacle to the teachers' participation (Schlager et al., 2002). Network infrastructure ought to be in place to provide access to the technology and to suit the needs of the community. This problem is often related with the decision of stakeholders on not to invest time and resources in an infrastructure that they believe is not used enough by the teachers (Schlager et al., 2002). As a result, this action reinforces a negative perception about using technology in the teachers' professional practice (Lock, 2006).
- In designing distributed or online communities of practice, it can not be assumed that the teachers are familiar with online participation. Often, they are not ready to work collaboratively in online environments, nor do all of them want to participate in online discussions or activities. In order to participate effectively in an online environment, the teachers need to be self-motivated, self-confident and have the required technological skills (Schlager et al., 2002). Salmon (2004) argues that "when participants feel 'at home' with the online culture, and reasonably comfortable with the technology, they move on to contributing" (p.36). Hence, fostering the teachers' confidence in using ICT will influence their participation within the community.
- The institutional culture in which the community is embedded can act as an obstacle to community development. On one hand, multiple tasks and busy schedules limit the teachers' online participation in the community and, on the other hand, the transition from working in an insular way, as it is generally is the case in educational contexts, to a collaborative environment where teachers have to share their ideas in a public space, entails a redefinition of both the teachers and the institutional culture. For change to occur it is central that the teachers receive support and incentives from stakeholders (Hunter, 2002).
- One of the principles of communities of practice is that they are self-directed, meaning that the members

> define the power and direction of the community. This perspective adds complexity to designing a community; designers need to create ways to support the development of relationships among members, but it is the members who, through active participation and interactions, make the community liveable. It is through assuming the responsibility for building the community that "members become owners and directors of their community" (Lock, 2006, p.673).

Communities of practice are not "the solution" to all the problems associated with traditional professional development nor will belonging to a community transform teaching practice from one day to another. In fact, communities of practice could add some new problems to the educational context. For example, Lisewski (2005) cautions us about the problem of using localized disciplinary communities of practice as the predominant source of professional development for new teachers. He argues that newcomers will be absorbed into practices, values, norms and cultural models that are taken for granted, so the community may limit criticism of current practice restricting change and innovation. In the same line of thought, with regard to the relation between an apprentice and the practice, Illeris (2000) asserts that if the apprentice has a positive position towards the practice there "will be a tendency towards an uncritical and limiting assimilative adaptation" (p.184).

That argument is consistent with Cooper's view (2004) of how teachers' learning takes place in disciplinary, situated contexts, "the ways in which teaching and learning are assumed to take place within a discipline are often not rationalized or examined, and are accepted as a set of mutually accepted givens" (p.88). In this respect, Edwards (2005) suggest that learning in communities of practice entails a socialization into existing beliefs, values and practices, but does not offer an account of how to deal with learning something new and how new knowledge is produced. To overcome this situation, Lisewski (2005) proposes that universities, in pursuing innovation and improvement in educational practices, should provide a "cross sector learning" (p.14) between informal, decentralized communities of practice in departments and a more formal, centralized community of practice. This will allow university teachers to engage in their situated disciplinary contexts as well as to get new insights from a more interdisciplinary and centralized perspective. He relates his concept with Wenger's call to create connections between different communities of practice:

The fundamental principle is to connect and combine the diverse knowledgeabilities that exist in a constellation of practices. The challenge

of organizational design is thus not to find the one kind of knowledgeability that subsumes all others, but on the contrary to coordinate multiple kinds of knowledgeability into a process of organizational learning (Wenger, 1998, p.247).

In the field of professional development, and coinciding with the perspective presented above, Gibbs and Coffey (2004) have found that centralized professional development programs provide a "kind of 'alternative culture' that counter-balances the negative influences of the culture of the teachers' departments" (p.98).

In other perspective, Trowler and Bamber (2005) call our attention to the fact that many professional development initiatives are relying on the concept of the reflective practitioner (Schön, 1983) with no consideration of the organizational learning. In their opinion, the policies of professional development often erroneously assume that interventions at the individual level will automatically impact the institutional level. "Relying on individual change to lead to systemic change commits the error of 'methodological individualism'; it exaggerates the power of agency over that of structure, seeing individual actors as the prime movers and shakers in social change" (p.84). For them, universities need more than many reflective practitioners in order to become learning organizations. Institutions need to develop learning architectures and enhancement cultures to support an ongoing improvement culture and professional development (Trowler & Bamber, 2005).

Summary section 2.4

Across this review of professional development in higher education and communities of practice, it is possible to argue that communities of practice might provide a framework in which university teachers become reflective practitioners, adopt new pedagogical practices and learn how to use technologies to enhance their teaching practices. Through the evolution of practice over time, new ideas can germinate and new methods and tools can be developed, but it is also clear that if universities aim to foster and sustain a cultural change in educational practices, a systematic effort towards institutional change is needed.

In the context of this study, the principles of effective communities of practice for professional development would inform the design of an intervention in which communication and collaboration between university teachers are seen as means to gain access to new information, to share their ideas, values and beliefs, to examine and learn different ways of thinking about teaching, to reflect on their own practice, and to become a new kind of university teacher during the process.

Chapter 3

On the Journey to Innovation of Teaching Practice

It takes a lot of courage to release the familiar and seemingly secure, to embrace the new. But there is no real security in what is no longer meaningful. There is more security in the adventurous and exciting, for in movement there is life, and in change there is power.

Alan Cohen

On the Journey to Innovation of Teaching Practice

The purpose of this chapter is to give the readers a basic understanding of the context on which this study is built.

The opportunity to engage in this study emerged as a consequence of diverse factors: The changing process towards the introduction of a new pedagogical model and ICT as a pedagogical tool at "Universidad Nacional" (UNA) in Costa Rica; my own professional practice for more than 20 years as a university teacher; and my research interest.

In this chapter, I trace the historical trajectory of UNA in the process of integrating ICT in the educational process, and I describe the features of the UNA context that are relevant to this research, such as the new pedagogical model and the new professional development system. To conclude, I introduce the research project, how it fits within UNA's educational vision and the specific case under study.

3.1 The First Steps of UNA

The Universidad Nacional (UNA) was established in 1973. It is the second largest university and one of four public universities in Costa Rica. It enrolls about 15,000 students who have the opportunity to study any one of the 85 educational programs offered. Besides the central campus in Heredia, UNA has several dependences throughout the country, such as scientific laboratories, research centers and educational centers. The Chorotega regional center, in the northeast part of the country, provides services at two campuses: Liberia and Nicoya. The Brunca regional center, in the south part, has two campuses: Perez Zeledon in the city of Perez Zeledon and Coto, 5 km from the Panama border. In 2008, the Universidad Nacional expanded to the North-Caribbean Region, by opening a new educational campus in Sarapiquí.

UNA, as well as other Costa Rican universities, are responsible for contributing to the generation of high-quality human capital. According to the World Bank (2000, 2002), universities are key institutions in generating more equitable and prosperous societies, and knowledge and skills of individuals are increasingly crucial in the welfare of a nation. In embracing this mission, UNA is opening opportunities to reinvent its conception of education, considering the adoption of innovative pedagogical approaches, the incorporation of new ICT into its curricula, and the new role of social networks.

The process of incorporating technology into the academic processes in UNA has its beginnings in the 90's with the availability of technological resources in the institution and the creation of the network UNANET. In that period, the academics used the network mainly for Internet, email, access to materials via FTP, and in some cases to participate in discussion lists. In 2000, UNA developed a virtual Master Program in Rural Development in agreement with the Universidad Austral de Chile. This first initiative started a process of reflection about the need to establish pedagogical, technological and administrative conditions to support blended and virtual learning modalities in the institution. This initiative fostered a change in the institutional perspective regarding the role of technology in education (Castro, 2009).

Since 2000, the incorporation of technology has been visible in other learning initiatives such as the Master in Museology, which developed a virtual promotion in 2005; and the Master programs in Administration of Technology (MATI) and in Educational Technology (MATIE) which promoted the use of learning management systems to support their teaching and learning processes.

In parallel to those individual initiatives, since 2002, UNA has taken institutional steps towards the incorporation of new ICT into its curricula. This process considers teaching staff as a crucial element. UNA acknowledges that higher education institutions require teachers who are well prepared and highly motivated, willing to abandon the traditional, passive approach of education and to face the challenges imposed on today's society. Furthermore, UNA is aware that introducing educational ICT in its curricula entails fundamental changes, affecting technical, pedagogical and organizational areas (Dirckinck-Holmfeld & Illera, 2006). To deal with these changes, UNA has defined new institutional infrastructures and policies addressing the implementation of a new pedagogical model, the introduction of ICT in teaching-learning practice and a program for professional development. All of these steps will be briefly discussed in the next sections, but prior to this, it is worth mentioning an international project which contributed to pushing forward the process.

3.2 The ELAC Project and UNA-Virtual: A Step Forward

The ELAC project started in October 2003 and concluded in September 2006. It was funded by the European Union with partners from Denmark, England, Spain, Mexico, Nicaragua, and Costa Rica. In

Costa Rica, the project was led by the International Center of Economic Policy (CINPE) at UNA and initiated a general discussion about the implementation of ICT at institutional level. Additionally, the experience obtained with the Moodle (Modular Object-Oriented Dynamic Learning Environment) platform through the project had promoted the adoption of Moodle as the official platform at UNA for supporting online, blended and regular courses. In this respect, the main contribution from ELAC was to establish the ground for a development strategy based on the integration of pedagogy, technology and organizational changes (Dirckinck-Holmfeld & Illera, 2006).

After the project finished, its institutionalization was continued through UNA-Virtual (created at the end of 2005) as a department in the Division of Teaching of UNA. UNA-Virtual has as its mission to orient the processes of innovation in teaching and learning towards the development of further academic excellence (Otoya, Hérnandez, Quesada, Hérnandez, & Jiménez, 2006).

UNA virtual is responsible for promoting a critical, reflective and creative incorporation of technology into teaching and learning. In order to accomplish this task, UNA Virtual promotes activities in two integrated components: pedagogical and technological. The pedagogical component introduces innovative pedagogical approaches considering the interaction among students, teachers, subjects and technological resources. The technological perspective promotes a continuous process of research, development, implementation and administration of technological applications to support teaching and learning. One of the main objectives of UNA-Virtual is to overcome the traditional paradigm of a lecture-based class, thus the introduction of ICT is seen as an opportunity to add new dimensions to the teaching-learning process.

In August 2007, the Academic Council of UNA approved the document "Políticas para la incorporación de las tecnologías de información y comunicación en los procesos académicos de la Universidad Nacional" (Policies for the integration of information and communication technologies in the academic processes of the National University). For the institution, this policy entails the formalization and organization of ICT integration within the educational process. The document establishes the general rules to guide the institutional efforts and work on this area.

3.3 A Pedagogical Model: A Necessary Step

The creation of a new pedagogical model in UNA was a participatory process in which the academic community expressed the principles and

guidelines to orient the academic practice. The model is based on

"the principles of respect to diversity in any expression, commitment to equal opportunities, formation of caring professionals concerned with social welfare, development of a research spirit in future professionals, and permanent improvement in the comprehensive formation of students and in academic, para-academic and administrative processes" (Sánchez et al., 2008, p.19).

The pedagogical model of UNA considers the following key elements: the concept of human being and society; the academic work; the teaching and learning processes; relationships in the educational process (roles and responsibilities); the function and conceptualization of the evaluation; and the role of technology as a means to facilitate interaction between teachers, students and learning contents.

In the new pedagogical vision of UNA, teaching and learning are understood as a social, historical and cultural process that goes beyond the mere transmission of knowledge. Teaching and learning are based on (1) the analysis and questioning of the reality; (2) research and practical work about the context in which a student and his career develops; (3) the development of skills for innovation and problem solving, (4) the negotiation of conflicts; (5) interdisciplinary group work; and (6) making decisions based on reliable and timely information (Universidad Nacional, 2007a).

Furthermore, the pedagogical model aims to promote a transition from teacher-centered models, where teaching is understood as the organization and transmission of content, towards more student centered models where the teachers' main role is the facilitation of the students' learning. In UNA's new conceptualization, teaching is understood as a complex and multidirectional process through which knowledge is constructed and shared. It is an experience that fosters students' and teachers' development, and it is a relational process that involves emotion and reason (Universidad Nacional, 2007a). Hence, teaching practice should be oriented to reflection, participation, collaborative work and innovation.

The new model assumes innovative methodologies and teaching practices, and alternative learning environments that rely on new technologies. UNA expects that the implementation of the pedagogical model (since 2008), together with processes of professional development and curriculum innovation would contribute to significantly enhance the academic practice. This statement is reflected in the Institutional Strategic Plan 2004-2011: "Teaching is based on an innovative pedagogical model, and incorporates the application of new technologies according to the advancement of knowledge" (Universidad Nacional).

3.4 Professional Development: A Fundamental Step

The new pedagogical model aims to create new opportunities to design innovative environments to support learning. But in UNA, as well as in other universities around the world, the traditional model of education is still widely practiced. Thus, in order to support a qualitative transformation in the institutional conception about education and to enhance the capacity of the university to teach with technology, it is essential for UNA to provide teachers with professional development in new pedagogical practices and methods of using information and communication technologies. Such processes of professional development "must include a change model that encourages commitment by both individual educators and leaders across the university" (Carr, Cox, Deacon, & Morrison, 2008, p.109).

An institutional program of teacher professional development is new to UNA. At present, the Division of Teaching is creating a Professional Development System that seeks to provide modules in pedagogy, evaluation and didactics with the goal to improve teaching performance in the classroom (Sánchez et al., 2008). This program consists of four levels: 1) Induction to university life (history, mission, vision, and values), 2) Pedagogy (methodology, gender, pedagogical model, assessment, and instructional design), 3) Technological training (research, ICT, bimodal approaches), 4) Professional updating (national and international seminars). All the courses in the Professional Development System would be voluntary and teachers will receive an institutional certification for their participation.

As part of both, the new program of professional development and the strategy for incorporating ICT in the educational practice (Universidad Nacional, 2007b), UNA-Virtual has designed several training modules, among them, a basic module "Appropriation of Technological Tools" (ARTA) and a more advanced module "Educational Innovation" (ID) that fit, respectively, in the level 2 and 3 of the professional development program. University teachers who decide to include technology in their practice are faced with a process of reformulating objectives, methodology, didactics and assessment as well as a reflection process about the role of teachers, students and technology. Both courses are of voluntary participation. The first one implies 20 hours of work for teachers and the second one 40 hours. Teachers that enroll in the courses and accomplish the required tasks receive a certification (university reward system) for their participation. Until the second semester of 2008, 33 teachers have been enrolled in the "Appropriation of Technological Tools"-course and 95 in the "Educational Innovation"-course (Castro, 2009).

UNA has several branches, regional centers, research stations and so on, and even though they are an important part of the university, many of the institutional efforts are placed on the central campus where the majority of students and teachers are concentrated, thus the institutional initiatives usually take longer to reach the regional campus. The training modules provided by UNA-Virtual are not the exception. UNA-Virtual has been offering the modules "Appropriation of Technological Tools" and "Educational Innovation" in a face-to-face modality at the central campus in Heredia. From the 128 university teachers that have been part of those courses, only two belong to a regional campus (Castro, 2009).

Teachers from regional campuses interested in taking the course have to make weekly travels to Heredia during 10 weeks, and the trip could take from 4 to 16 hours round-way depending of the regional campus. Furthermore, a high number of academics in the regional centers are hired by temporal and part-time contracts, and they undertake a range of different tasks (academic, outreach, administrative) within the regional center, so time is a scarce resource for them. Under those conditions, access to a centralized development process is often difficult for those university teachers. On the other hand, the geographical distances plus limitations of time and resources have made it difficult for UNA-Virtual to reach teachers from those centers. The combination of the two factors hinders the teachers' opportunities to develop their practice in relation to the introduction of ICT, as well as it hinders UNA-Virtual's possibility of broadening its institutional scope.

In this context is where this study emerges. It seeks an exploratory response to the need of both, the institution and the teachers of the regional campuses in promote processes of pedagogical innovation. It means that the point of departure for the project is the practitioners' issues but the problem is seen as an opportunity to move towards transformative and innovative approaches in the field of professional development. Thus, the goal is to conduct empirical research that allows us to make practical and theoretical progress through refining our understanding and knowledge about teacher professional development.

3.5. Communities of Practice: An Alternative Step

The literature review in chapter two about effective professional development suggests that professional development for academics should be identity transforming; focus on reflective practice; recognize and respect differences in teachers' backgrounds, prior experiences and areas of expertise; recognize and respond to teachers' needs; be action-oriented in authentic settings; promote collaboration and building of trust relationships; and provide an ongoing support for continuous and

sustained learning (Gibbs & Coffey, 2004; Laurillard, 2002; Lawler & King, 2003; Light & Calkins, 2008).

Furthermore, I have argued that a community of practice (Wenger, 1998) framework in which academics engage in their own learning, collaborate and support each other, and have a supportive context for inquiry, action and reflection, have the potential to successfully accomplish those general principles of effective professional development. Communities of practice can provide the ongoing support which teachers need for transforming their practice while enabling them to integrate their professional practice with their professional development. In addition, this social theory of learning can be useful in understanding the introduction of ICT and new pedagogical approaches as a learning process in which the new desired teaching practice is constructed in a process of negotiation of meaning among teachers.

Considering the institutional interest and the indisputable importance of professional development processes reaching the entire UNA teacher staff, the research project presented in this thesis is conceptualized as a project for community-oriented teacher professional development addressing the introduction of information and communication technology and project-oriented problem pedagogy (POPP) into teaching and learning.

The project takes its point of departure in the previous experiences of UNA-Virtual with the "Educational Innovation" module, and supports the argument that learning as part of a (distributed) community of practice can provide a powerful and useful model for teacher professional development (Barab & Duffy, 2000; Schlager et al., 2002; Sherer et al., 2003; Wing Lai et al., 2006) and that project-oriented problem pedagogy and information and communication technology can be both used to foster a change from a pedagogy based on the transmission of information towards a pedagogy of constructing knowledge through collaboration, projects and problem orientation (Dirckinck-Holmfeld, 2002; Kolmos et al., 2004). Here, the community-oriented professional development model proposed in this thesis is designed under the integration of three bodies of literature - the principles for effective professional development, and the learning principles of communities of practice and POPP -, and it is oriented to provide teachers with an environment that can lead to a transformation in their beliefs and teaching practices.

The model is embedded into the institutional context, acknowledging that institutional policies, organization, structure and culture have an impact on the professional development process.

3.6. The Professional Development Model and UNA's Pedagogical Vision

In this section, I would argue that the conceptualization of the professional development model in this study is strongly aligned with UNA's institutional vision about teaching and learning processes.

As I have commented above, the introduction of technology to enhance teaching and learning processes is prioritized by UNA authorities. The institution has approved new policies about the introduction of ICT in the learning process (Universidad Nacional, 2007b) that promote the gradual introduction of ICT to enrich the educational process and diversify the teaching and learning approaches. However, the use of technology is still new for many UNA teachers and even more so the use of technology for educational purposes (Castro & Zurita, 2006). In the context of the project and in alignment with the Pedagogical model, the introduction of ICT in the curriculum is not seen as an end in itself but as an opportunity for changing the traditional pedagogical practice designing innovative environments to support learning. We are aware that technology per se does not change educational practices, but brings opportunities to rethink teaching and learning and to transform the role of teachers and students (Bates, 2000; Dirckinck-Holmfeld, 2002; Price et al., 2005). Indeed, a successful integration of technology and pedagogy within university teachers' practice would require a broader educational strategy that promotes the principles of the UNA pedagogical model.

The spirit of the UNA pedagogical model is very broad and general, it does not point out to any specific didactic strategy. UNA expects that its application will be enacted through diverse strategies of teaching and learning in accordance with the object of study, its nature and its practice. These general and flexible principles entail some practical difficulties, especially for teachers without pedagogical background. In the daily practice, the interpretation and reification of the pedagogical model rest heavily on the teachers' understanding of its principles; on the teachers' own experiences of education; on their conceptions of teaching and learning; on their pedagogical knowledge, experience and skills to implement different didactic strategies; on the influence of their disciplinary context and on the negotiation that takes place in classrooms among teachers, students and practice.

In this project, POPP is understood as one possible concretization of the UNA pedagogical model. As it was explained in chapter two, POPP is an interdisciplinary, contextualized, student-centered learning approach (Lehmann et al., 2008), it is a combination of a problem-based and a project-organized approach where students analyze and define problems within a defined subject frame and then work together in groups

on a project (Kolmos et al., 2004). In POPP, the point of departure for the learning activities is the problem formulation. Through formulating the problem, students are encouraged to rethink the problem situation and to argue why and how the problem is interesting to research from a societal, scientific and a personal perspective (Dirckinck-Holmfeld, 2002). In this respect, the nature and learning goals of POPP are aligned with the UNA pedagogical model,

> [The teacher] should encourage students to develop skills and capabilities for research, invention and discovery. [He/She] should offer a learning environment in which students gain confidence in their own ideas; make decisions and accept mistakes as constructive [...]; it should help students understand that there are various options for solving a problem, and avoid the mental rigidity that leads to supposing that knowledge is unique and immutable. (Universidad Nacional, 2007a, p.9, my translation)

As an approach to organize the educational process, POPP can guide teachers to facilitate students' learning by encouraging them to be open for alternative solutions to problems; to analyze and interpret information; to connect theories and experiences to practice; to reflect and evaluate their learning process; and to become self-directed learners. In this perspective, POPP+ICT can enable a shift from teacher-centered models towards student-centered models of learning.

The UNA pedagogical model encourages an educational practice aimed at reflection, participation, collaborative work and innovation. The practice of university teachers is considered "not as an isolated experience, but as the result of knowledge, experiences, sharing of ideas, innovation with technologies, and rigorous discussion with academic peers, students and administrative personnel" (Universidad Nacional, 2007a, p.9, my translation). I would argue that these fundamental principles in teaching practice are consistent with the learning principles of the proposed professional development model. A community of practice framework could be useful for understanding and promoting the conceptualization in which knowledge is constructed and shared through the interaction and negotiation among university teachers (Baek & Barab, 2005; Henderson, 2006; Lock, 2006). In our context, university teachers belong to specialized communities and usually they have limited opportunities to engage in conversations about their teaching practices. Thus, their participation in an emerging community across regional centers, faculties and schools would open opportunities for more extensive conversations and sharing of knowledge.

To teachers being members of the community of practice would be a challenge as well as an opportunity to rethink teaching and learning

practices and to get a new set of qualifications. The literature suggests that when teachers have opportunities to explore, discuss and reflect about their teaching conceptions and practice, they become less resistant towards different pedagogical approaches (Cranton & King, 2003; Layne et al., 2004; Smyth, 2003). In combination with the reflective practice, the literature also points to the importance of providing teachers opportunities to implement what is learned (Gallant, 2000; King, 2003; Lawler & King, 2000) and, in the proposed model, this aspect is achieved through the design, implementation and evaluation of a pedagogical innovation in classrooms. Teachers will be encouraged to approach this pedagogical innovation through a scholarship of teaching lens, meaning a process of problem formulation, reflection, inquiry, evaluation, documentation and communication. (Laurillard, 2002; Trigwell et al., 2000).

Furthermore, the project is the first initiative of UNA in the field of online teacher professional development and, in this respect, one of its aims is to provide an alternative conceptualization of professional development processes from formal training to learning in practice, where learning in practice is a participatory process that involves "doing, becoming, and belonging, not simply acquiring" (Ng & Hung, 2003, p.62). In addition, the participation of university teachers in these social spaces and the use of technologies in the communication and learning processes would motivate teachers to learn new norms, values and practices (Coto & Dirckinck-Holmfeld, 2007).

3.7. The Case: UNAgora Community

At the institutional level, the project is supported by UNA-Virtual and the Division of Teaching of UNA under the institutional project "Virtual Community of Practice for Educational Innovation at the Regional Campuses of the Universidad Nacional" (Coto, Mora, & Corrales, 2008). For its development, the project received a funding support from FUNDER (University Funds for Regional Development) in order to cover the expenses related with co-located meetings and hardware infrastructure to support the online interaction of the community.

The design and implementation of the project is a collaborative effort among UNA-Virtual and the researcher. Since September 2007 to December 2008, a member of UNA-Virtual (the facilitator of the community) and the researcher have been working with the conceptualization and definition of the professional development environment. The design process is the result of a negotiation process between multiple perspectives, such as the institutional context, the

facilitator's conceptions about professional development, the teachers' multiple constraints, and the researcher's goals and theoretical principles.

3.7.1 The participants

The project began in March 2008 with a group of 27 teachers from five geographically distributed campuses who have diverse fields of knowledge and diverse approaches to teaching and learning as results of their own professional experiences and context. Figure 3.1 shows the distribution of participant teachers. The Chorotega Regional Center, in the northeast part of the country, provides services at two campuses: Liberia and Nicoya. The Brunca Regional Center, in the south part, has two campuses: Perez Zeledon and Coto. In Puntarenas, the center participating in the project is the Marine Biology Station. In the figure, the numbers in brackets indicate the number of teachers participating from each campus. For example from Liberia, seven teachers participated in the process.

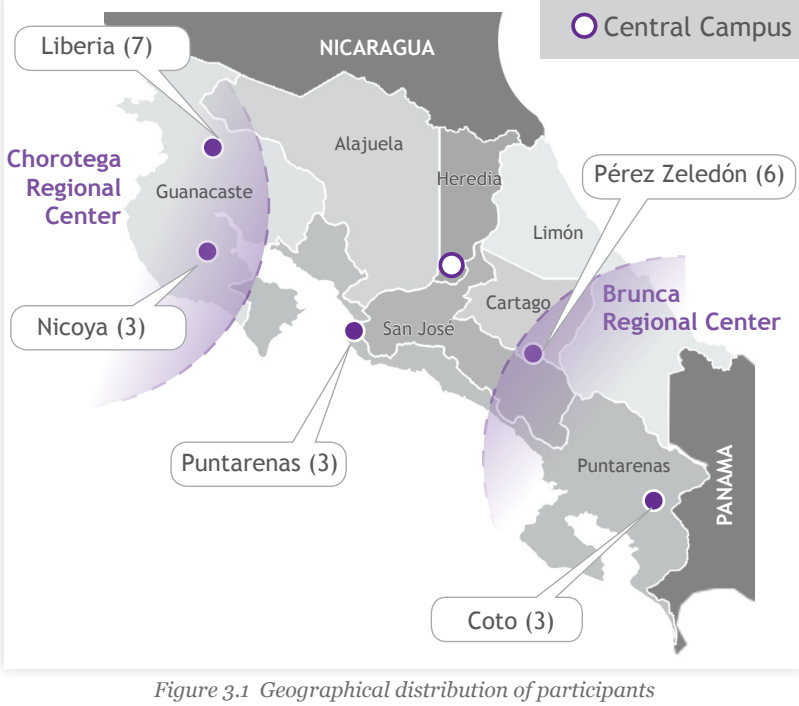


Figure 3.1 Geographical distribution of participants

Table 3.1 shows an overview of the participating teachers' profile with respect to age, gender, teaching experience, contractual relation with UNA, familiarity with the use of technological tools, and their previous experience with technology and/or PBL in classroom. The combination of these elements informed the design process, as well as the findings.

Aspect	Data	Percentage
Average age	41	
Gender		
Female		43%
Male		57%
Average years of experience as university teacher	8	
Have a permanent contract with UNA		30%
Familiar with the use of office tools (word, excel…)		100%
Familiar with the use of searching tools		96%
Familiar with the use of communication tools (messenger/skype)		70%
Previous experience with online courses		30%
Previous experience with using technological tools in the academic work (power point, Internet, email)		91%
Previous experience with the use of technology to enhance students' learning (Internet, videos, web applications, educational software)		61%
Previous experience with the use of pedagogical approaches such as problem-project based learning		35%

Table 3.1 Participant's profile

The participation of teachers in the project was voluntary responses to an open invitation made by UNA-Virtual to the Director of each regional campus. The educational intervention had duration of 32 weeks and teachers participating in the project were compensated within the university reward system with a certification for 104 online participation hours and 24 physical participation hours. This certification is aligned with what is suggested by the literature on professional development about enhance teachers' status within the learning community (Lloyd & Cochrane, 2006; Lloyd et al., 2005), and

be tied to university reward systems (Lawler & King, 2001). Basically, we understood the certification as an external motivator for teachers' participation in the project. It would help teachers in their promotion and academic career. Furthermore, the certification for participating in the professional development initiative, contributes to align teachers' efforts with institutional polices.

The estimated workload for teachers per week was four hours (two hours for individual activities, readings and reflection and two hours for group work). In order to obtain the certification, the teachers should participate in at least 80% of the activities, and design, implement and evaluate a pedagogical innovation in their classrooms.

3.7.2 The technological context of UNAgora

Given the geographical distribution of the regional campuses, the project uses networked technologies for two purposes: (1) contributing to the reduction of space and time barriers favoring the interaction among teachers; and (2) supporting a more transformative, sustainable and scalable teacher professional development program within the institution (Schlager et al., 2002). During ten months (February to November 2008) the teachers participated in collaborative activities that helped them to get to know each other, to develop trust and to improve their pedagogical and technical knowledge (Coto & Dirckinck-Holmfeld, 2008). The learning environment was designed as a framework for flexible and blended learning, with the teachers as the main agents of their professional development, supported by an environment rich in challenges and interactions around the philosophy and methodologies of problem and project based learning (Dirckinck-Holmfeld, 2002; Kolmos et al., 2004).

Literature states that technology must support the goals, activities and needs of the community (Wing Lai et al., 2006). The UNAgora community is embedded in an institutional context with defined policies on the institutional technology infrastructure to be used in the academic context. Although these policies are not restrictive, they are the starting points for new initiatives.

The Moodle system is the institutional learning management system (LMS) used by UNA to support online courses or face-to-face courses enhanced by technology. Moreover, there is a prior experience with UNA-Virtual in using the system as the "institutional virtual classroom" hence, to some extent Moodle is already integrated in the academic practice. In this study, it was therefore decided that the online interaction in UNAgora would rely on an "online meeting space" created

under the Moodle platform.

The Moodle learning platform offers diverse tools (forums, chat rooms, a dialogue tool, a journal, a glossary, wikis, and a workshop tool) aimed at supporting collaboration, activities and critical reflection. Many of these tools will be used by the facilitator for fostering the teachers' interactions and community activities. In addition, email, Skype or MSN will be used for community activities. Most of the teachers check email fairly regularly, so this is often the best and most timely way to get a message.

3.7.3 Characterizing UNAgora

According to Wenger et al. (2002), communities of practice can take many forms (as it was introduced in the previous chapter). In this project, and with the aim to clarify what kind of community we are designing for, we can state that UNAgora is:

- an intentional community because we are intentionally developing it to advance a desired teaching practice;
- structured because a learning agenda, activities and roles have been defined;
- distributed because members are distributed over the country and communication and interaction take place through physical and online media;
- heterogeneous because all teachers have different backgrounds and fields of expertise, but, to some extent, it could also be seen as homogenous because all members as university teachers have very similar functions
- homogenous because all members, as university teachers, share the same practice, but to some extent also heterogeneous because all teachers have different backgrounds and fields of expertise
- across regional boundaries because it is not bounded by a particular regional campus, and
- supported because it is provided with direct resources from UNA.

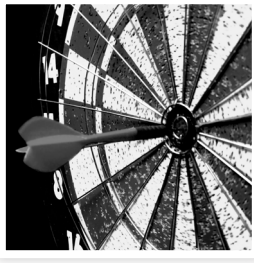
Summary

The purpose of this chapter was to frame the research project into the context of UNA's new policies and challenges as well as to establish the "readiness" of the institution to face them. Throughout the chapter, I have discussed the several steps that UNA has undertaken to innovate and improve the quality of the learning process. These steps are focused on the creation of an institutional pedagogical vision, the creation of a professional development system and policies to integrate ICT in the curriculum. This research proposes a community of practice framework as an alternative conceptualization of professional development for teachers in the regional campuses.

My goal in this study is to explore and understand to what extent a professional development program with a focus on community is able to open up a new practice for university teachers. The literature suggests that designers may be able to establish organizational forms, learning tasks, and learning spaces to invite, promote or facilitate interactivity but that it is the social activity of the members that builds the sense and value of community (Goodyear, Jones, Asensio, Hodgson, & Steeples, 2001). In the same vein, Wenger (1998) suggests that communities can never be the result of a design, only a response to it. In this respect, the study presented here is built on the premise that the researcher and the facilitator can create an environment with potential for the community but that it is the members themselves who have to exploit the opportunity and thereby create the community and the learning of a new practice.

In chapter 6, I will present the detailed design of the educational intervention and the learning principles that support it. The development of UNAgora as well as the challenges in building a social network through which teachers can transform and share their teaching practice is fully explained in chapter 7.

Chapter 4



The Methodology and Design of the Study

First, have a definite, clear practical ideal; a goal, an objective.
Second, have the necessary means to achieve your ends;
wisdom, money, materials, and methods.
Third, adjust all your means to that end.

Aristotle (384 BC-322 BC)

The Methodology and Design of the Study

This chapter is dedicated to the presentation of the research methodology and the followed research process. First, I locate the study within a paradigm and methodology. The second section presents a rather detailed description of design-based research. In the third section, I explain how design-based research was used to guide the research process, including the research strategies and methods of data generation. In the fourth section, the analysis process is presented and, in the last four sections, the participants, the role of the researcher, the ethical considerations and the quality criteria such as reliability, validity, generalizability, replicability and sustainability are discussed respectively.

4.1 Paradigms, Methodology and Methods

In this section, I discuss the different paradigms which I was involve in understanding the development of knowledge, and the methodology to go about the generation of that knowledge.

4.1.1 Locating the study in a paradigm

A research paradigm influences the way knowledge is studied and interpreted. A paradigm is defined by Bogdan and Biklan (1998, p.22 cited in Mackenzie & Knipe, 2006) as a "a loose collection of logically held together assumptions, concepts, and propositions that orientates thinking and research". Likewise, Guba and Lincoln (1994) define a paradigm as a "basic belief system or world view that guides the investigator" (p.105). A paradigm is thus the identification of the underlying basis used to construct and conduct a research study; it guides the selection of tools, participants, and methods used in the investigation.

Locating this study in a research paradigm was a difficult task due to two reasons: 1) the diverse terminology and varied emphasis in talks about paradigms in the literature, and 2) because I felt identified with several features of the different paradigms.

In the literature about research, the same concepts of paradigm explained above are called "knowledge claims" (Creswell, 2003), "models" (Silverman, 2000), "research philosophy" (Saunders, Lewis, & Thornhill, 2000) or "epistemology" (Ritchie & Lewis, 2003). Furthermore, some authors locate paradigms under the umbrella of

qualitative and quantitative research, others in the inverse way, and others do not make any reference at all of the concept, which makes it difficult for an early career researcher as me to know how relevant the notion of paradigm is or where in the research process it fits.

Before I explain my choice of paradigm, I provide a short summary of the features of the main paradigms as they are categorized by Mackenzie and Knipe (2006), (with no intention of going in depth about history, definitions or comparisons among paradigms). The authors acknowledge the varied use of terms that refer to paradigms, and propose four broad paradigm groups: positivist/postpositivist, interpretivist/constructivist, transformative and pragmatic. Table 4.1 shows an extract of their argument (Mackenzie & Knipe, 2006, p.193-194).

Paradigm	Key features
Positivist/ postpositivist	- "Reflects a deterministic philosophy in which causes probably determine effects or outcomes" (Creswell, 2003, p.7) - Aims to test a theory or describe an experience "through observation and measurement in order to predict and control forces that surround us" (O'Leary, 2004, p.5). - Postpositivists work from the assumption that any piece of research is influenced by a number of well-developed theories apart from, and as well as, the one which is being tested (Cook & Campbell, 1979, p.2) - Commonly aligned with quantitative methods of data collection and analysis.
Interpretivist/ constructivist	-Has the intention of understanding "the world of human experience" (Cohen & Manion, 1994, p.36) - "Reality is socially constructed" (Mertens, 2005, p.12) - Researchers tend to rely upon the "participants' views of the situation being studied" (Creswell, 2003, p.8) - Researchers recognize the impact of their own background and experiences on the research - Relies on qualitative data collection methods and analysis or a combination of both qualitative and quantitative methods. Quantitative data may be utilized to support the qualitative data.
Transformative	- Transformative researchers felt that the interpretivist/constructivist approach to research did not adequately address issues of social justice and marginalized peoples (Creswell, 2003, p.9). - Transformative researchers "believe that inquiry needs to be intertwined with politics and a political agenda" (Creswell, 2003, p.9) - Research contains an action agenda for reform "that may change the lives of the participants, the institutions in which individuals work or live, and the researcher's life" (Creswell, 2003, pp.9-10). - May utilize a mixed-methods approach, allowing for an understanding of "greater diversity of values, stances and positions" (Somekh & Lewin, 2005, p.275)

Paradigm	Key features
Pragmatic	- Pragmatism is not committed to any one system of philosophy or reality. - Pragmatist researchers focus on the 'what' and 'how' of the research problem (Creswell, 2003, p.11). - Places "the research problem" in center and applies all approaches to understanding the problem (Creswell, 2003, p.11). - With the research question 'central', data collection and analysis methods are chosen as those most likely to provide insights into the question with no philosophical loyalty to any alternative paradigm.

Table 4.1 Research paradigms. Information extracted from Mackenzie & Knipe (2006)

As I have said, to choose a paradigm is a complex problem. My background is in Computer Science, so I am more familiar with the positivist/postpositivist approach. By the nature of my field of expertise, I am used to manipulate variables, establish relations between cause and effects, and to measure outcomes. However, my interest in this research is aligned with the social sciences, and my vision on what counts as knowledge and how this is constructed has gradually evolved in the last three years. Indeed, the research problem that I aim to understand is a social phenomenon where the generated knowledge and meaning is seen as a social construction, thus it was clear that my research questions cannot be answered through this line of thought. In this perspective, I was able to discard without difficulties the positivist/postpositivist approach.

In the interpretivist/constructivist paradigm, the intention of the research is to make sense of the meanings others have about the world. Researchers focus on the processes of interaction among individuals and on the specific contexts in which individuals live and work, and recognize that the researchers' own background shapes their interpretation (Creswell, 2003). This paradigm seems appropriate for this research because it seeks to understand the nature of a purposely designed community-oriented professional development environment, and the manner in which academics respond, participate, and construct meanings about their teaching practices. This construction of meaning is socially and historically negotiated among participant teachers, and in direct relation with their working context at the university. Change of beliefs and values, and creation of new meanings about new teaching practices is embedded in a socio-cultural context, and in the interaction with the other members of the community.

In the transformative paradigm, researchers, as constructivists, advocate that reality is constructed within a historical and social

context, but they are more focused on power relations. Participatory action is focused on bringing changes in practices, and participants are considered as collaborators in the research (Creswell, 2003). In the context of this study, I understand research as a way to improve practice, and the transformative paradigm with its focus on agency and change, provides a useful framework, even though is not the aim of this research to "emancipate" people. I can "locate" my research in the transformative paradigm, in the sense that it is a collaborative research, interventionist, and change-oriented. The research aims, through a professional development experience, to transform teachers' understanding of their roles, values and beliefs towards teaching practice, and through this new understanding transform their practice in classrooms. Furthermore, the cultivation of a culture of sharing aims to transform relationships between university teachers.

Researchers in the pragmatic paradigm argue that in order to appreciate the meanings and validity of ideas, it is necessary to understand the difference they make in practice, and this meaning is always related to the context where the action takes place. This line of thought follows John Dewey's pragmatic rule: "In order to discover the meaning of the idea, ask for its consequences" (Dewey, 2004, p.94). The pragmatic paradigm is concerned with solutions to problems, with "what works" (Creswell, 2003). I may say that the study presented in this thesis is pragmatic, because it aims to solve real-world practical problems while examining the value of the theory of communities of practice in an empirical intervention. The project aims to construct knowledge through an action (the intervention) to generate knowledge, thus the empirical work attempts to better understand how university teachers can be supported in the process of transforming teaching practices, and what contextual factors support or hinder this transformation.

In summary, I argue that this research study is informed by a pragmatic paradigm, because it is oriented to real-world practice. However, it also has influences from both the transformative and the constructivist paradigm. From the former because it is a collaborative project oriented to foster change, and from the latter because knowledge is constructed from the participants' meanings and interaction and within a social and historical negotiated context. All these research characteristics guide the choice of the most appropriate research methodology for the study.'

4.1.2 The methodology or research approach

In the context of this study, methodology is understood as the overall approach to research, and it is linked to the chosen paradigm. Methods are systematic modes, procedures or tools used for collection and analysis of data (Mackenzie & Knipe, 2006).

The aim of this research is to explore to what extent a designed professional development framework based on communities of practice can support a transformation of teaching practices in higher education. One of the objectives in achieving this aim is to develop principles that can be used to design professional development programs that can effectively support teachers in the process of innovating their teaching practices through the introduction of technology and POPP. Another objective is the development of a professional development environment that can exemplify the role of those principles. These objectives are theoretical and practical: design principles with a theoretical basis and their application in a real context environment.

Therefore a suitable approach will be one that proposes design principles and also guide the implementation of them in a real context. For these reasons a design-based research approach (Barab & Squire, 2004; Design-Based Research Collective, 2003; Sandoval & Bell, 2004) has been selected.

Design-based research is a methodology originated in the pragmatic paradigm, inspired on Dewey's research model that employed the "systematic study of teaching and learning associated with the enactment of complex educational interventions" (Bell, Hoadley, & Linn, 2004, p.74). Design-based research draws from "pragmatic lines of inquiry where theories are judged not by their claims to truth, but by their ability to do work in the world" (Barab & Squire, 2004, p.6)

The Design-Based Research Collective (2003, p.5) defines design-based research as "an emerging paradigm for the study of learning in context through the systematic design and study of instructional strategies and tools". Even when they define design-based research as a paradigm, most design-based researchers consider it as a methodology, as I will discuss in section 4.2. For the purpose of this study, design-based research is considered as a methodology aligned with the pragmatic paradigm.

In achieving its aims of improving educational designs and advancing understanding of learning, design-based research draws on the full range of social science research methods, combining a variety of quantitative and qualitative approaches. In this methodology, researchers collaborate with participants to achieve theoretical and

pragmatic goals that change and improve educational practices. Hence, one of the tenets of design-based research is that theory informs practice and practice informs theory.

In section 4.2, I describe in detail the approach, its characteristics, process, development and challenges but, in this section, I want to highlight the different kinds of design-based research that have been identified by Bell (2004) in his paper "On the Theoretical Breath of Design-Based Research in Education". He argues that design-based research is "by necessity a manifold enterprise with regard to research focus, practice, and underlying epistemology" (Bell, 2004, p.245), and this diversity can be used across paradigms in order to advance our understanding of the learning phenomenon.

- Developmental psychology design-based research: focuses on the theory and design work such as developmental phenomena, socio-cognitive development, dimensions of human growth (identity formation, moral growth, perceptual learning, or gender development).
- Cognitive science design-based research: focuses on cognitive phenomena such as perception, analogical or schematic reasoning, meta-cognition, decision making, and problem solving. Internal validity and generalizability are core commitments.
- Cultural psychology design-based research: focuses on the cultural mediation of mind and on the cultural-historical foundations of development and learning as it develops thorough patterned interactions between individuals and artefacts. Recognizes the significant impact of the social context in which the work takes place.
- Cultural anthropology design-based research: focuses on how the participants, in an educational intervention, create meanings through their engagement in the activities that frame the intervention.

From the perspective of this study, the last two approaches, cultural psychology and cultural anthropology, complement each other, and are aligned with the theoretical framework of socio-culture adopted in this study. The cultural psychology approach enables me to consider the historical, social and cultural context in which the intervention is embedded and the anthropological approach provides the tools to

understand how the participants respond to, and interact with the educational intervention.

4.1.3 Using qualitative methods

A qualitative approach enables researchers to understand how people respond to particular events in their natural settings. Design-based research is an integrative approach, so depending on the nature of the intervention and how it evolves; researchers need to combine a variety of approaches, both quantitative and qualitative. The intervention carried-out in this study is mainly addressed through qualitative methods where "the basic subject matter is no longer objective data to be quantified, but meaningful relations to be interpreted" (Kvale, 1996, p.11). Two partially quantitative questionnaires were used in two different moments of the intervention, but the information was utilized to supports the qualitative data. The data collection methods and analysis will be explained in sections 4.3 – 4.4.

At this point, I have tried to locate the study within a prevailing research paradigm (pragmatic), but acknowledging the influence of other paradigms (constructivist and transformative). Furthermore, I have briefly explained the chosen methodology, its relation with the paradigm, and the kind of data collection and data analysis methods utilized in this research. In the next section, I will explain in detail the design-based research methodology.

4.2 Design-based Research: Emergence, Development and Challenges

The aim of this section is to present a literature review of design-based research. I have considered important to describe the approach in some detail because through presentations and conversations during the development of this study, I have realized that there are many misconceptions about the research approach. My aim is therefore to make a clear description of the approach and its strengths and weaknesses.

4.2.1 What is design-based research?

Educational leaders, policymakers, researchers and practitioners often consider educational research to be separated from the problems and issues of everyday practice, resulting in "unusable knowledge" (Lagemann, 2002, p.1). This gap creates a need for new research approaches that directly address problems of practice and advance

a development of knowledge that can be applied in practice. Design-based research emerges with the aim of closing this credibility gap in educational research (Levin & O'Donnell, 1999), contributing to a better connection of educational research with practice through producing knowledge that is usable.

The methodology is described in the literature using diverse terms: design experiments (Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; Collins, 1992) design research (Bereiter, 2002; Collins, Joseph, & Bielaczyc, 2004; Edelson, 2002; Reeves, Herrington, & Oliver, 2005; van den Akker, Gravemeijer, McKenney, & Nieveen, 2006), development research (van den Akker, 1999) and design-based research (Barab & Squire, 2004; Bell, 2004; Design-Based Research Collective, 2003; Sandoval & Bell, 2004). The Design-Based Research Collective proposes the use of the term design-based research to avoid "mistaken identification with experimental design, with studies of designers, or with trial teaching methods" (2003, p.5).

Since the 90's, when it was first conceptualized (Brown, 1992; Collins, 1992), design-based research has grown in importance. Recently, some educational journals dedicated special issues to design-based research, Educational Researcher (Vol. 32, No. 1, 2003), The Journal of the Learning Sciences (Vol.13, No. 1, 2004), Educational Psychologist (Vol. 39, No. 4, 2004) and Educational Technology (Vol. 45, No.1, 2005), providing the theoretical and analytic foundations of the methodology as well as case studies to illustrate its application. There are also books contributing to the development of design-based research, Educational Design Research (van den Akker et al., 2006), and Handbook of Design Research Methods in Education (Kelly, Lesh, & Baek, 2008).

While there are several definitions for design-based research, Wang and Hannafin (2005) propose one that captures its main characteristics:

> *A systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories (p.6).*

In design-based research, the boundaries between design and research become blurred; the design is regarded as an opportunity to advance the researcher's understanding of the phenomena under study. The design part of the methodology entails designing an intervention aimed at proposing a solution to an educational problem identified

as significant. This intervention is based on principles drawn from theory, previous research and literature and it serves as the context for the research. The research part includes an iterative cycle of design, implementation, and analysis as well as a redesign that inform the improvement of the design. In this process, the role of design is critical in the sense that it not only evaluates a theory but contributes to its development.

This study combines an intentional design of a professional learning environment for university teachers based on the theories of communities of practice and professional development, with an empirical exploration of my understanding of the interactions between the designed intervention, university teachers' experiences and the institutional context.

4.2.2 Characterizing design-based research

Researchers have proposed different ways of characterizing design-based research. In my criteria, the five basic characteristics proposed by Wang and Hannafin (2005) cover what researchers seem to agree on regarding this topic. They characterize design-based research as Pragmatic, Grounded, Interactive, iterative and flexible, Integrative and Contextual.

- Pragmatic: Because it aims to solve real-world problems while refining both theory and practice through the designed interventions. Its value is partially measured in terms of its utility to improve practice (Design-Based Research Collective, 2003; Wang & Hannafin, 2005).
- Grounded: It is grounded in theories about teaching and learning and it is conducted in a real-world context where participants interact with each other within a context with all the complexities of authentic practice (van den Akker, Gravemeijer, McKenney, & Nieveen, 2006).
- Interactive, iterative and flexible: The research process requires an interactive collaboration among practitioners and researchers in order to identify approaches and principles to address the problem (Design-Based Research Collective, 2003; Reeves et al., 2005). The process of developing and refining theory and intervention is an iterative cycle of analysis, design, implementation, and redesign that usually takes a long period of time (Bannan-Ritland, 2003)

and design-based research is a flexible process because collaborators are constantly improving the initial design through implementation (Wang & Hannafin, 2005).

- Integrative: Depending on the nature of the intervention and how it evolves, researchers need to combine a variety of approaches from quantitative and qualitative research paradigms. Data obtained from multiple sources increase the validity, objectivity and applicability of the research (Design-Based Research Collective, 2003; Wang & Hannafin, 2005).
- Contextual: Design-based research focuses on specific processes in specific contexts where researchers try to understand this interaction as an integral phenomenon. Consequently, the research results need to be connected with both the design and the context (van den Akker et al., 2006; Wang & Hannafin, 2005).

4.2.3 Comparing design-based research with other research approaches

Design-based research is sometimes mistaken with other approaches that share some of their characteristics. In this section, I will explain how it differs from action research, experimental research, and formative evaluation.

1. Design-based research and action research

Design-based research incorporates several concepts from action research, but there are also fundamental differences. In both design-based research and action research approaches, researchers work together with practitioners looking for a solution to real world problems, but while design-based research seeks to develop design principles that can guide future design efforts there is no effort in action research to construct theory (Reeves, 2000). In this sense, design-based research has "more potential value" than action research because it entails seeking practical solutions to real world problems as well as the construction of design knowledge to inform others (Reeves et al., 2005, p.107). Another difference pointed out by Wang and Hannafin (2005) is that, in action research, it is usually the practitioners who initiate the research and the researchers help them facilitate the research process, whereas in design-based research, it is usually the researchers who initiate the process.

2. Design-based research and experimental research

Design-based research is often mistaken with experimental research, especially when it is used under the label of design experiments. Collins (Collins, 1992; Collins et al., 2004) compared how experimental research differ from design-based research in several aspects:

- Messy situations vs. laboratory settings: While design-based research takes place in complex and messy real life setting, experiments are conducted in controlled laboratories.
- Multiple dependent variables vs. a single dependent variable: In design-based research multiple variables are present that affect the learning process; and laboratory experiments usually focus on one single dependent variable.
- Characterizing the situation vs. controlling variables: In design-based research the goal is to characterize the variables that affect a complex situation, whereas in laboratory experiments the goal is to identify a few independent and dependent variables, controlling all the other variables.
- Flexible design revision vs. fixed procedures: Design-based research starts with a not completely defined design and it is revised through a flexible and iterative process while laboratory experiments follow a fixed procedure aimed to have a strict control over the variables.
- Social interaction vs. social isolation: Design-based research is conducted in a real world context, thus it entails social interaction. In most laboratory experiments, the subjects do not interact with others neither with the outside world.
- Developing a profile vs. testing hypotheses: The objective of design-based research is to study many aspects of the design and develop a profile that characterizes the design in practice as opposed to experimental laboratories whose objective is to test the hypotheses that the researcher has established previously in the experiment.
- Co-participant design and analysis vs. experiments: In the design-based research process, different

> participants collaborate, thus affecting the decisions taken during the process, whereas in laboratory experiments. it is usually the researcher who makes all decisions in order to maintain control of the whole experiment.

3. Design-based research and formative evaluation

According to Barab and Squire (2004), design-based research and formative evaluation are similar methodologies because "both are naturalistic, process-oriented, iterative, and involve creating a tangible design that works in complex social settings" (p.5). Both methodologies entail an iterative process to analyze and refine an intervention, however the main difference between them it is the strong focus on design-based research towards the understanding and refinement of new models that can further advance theory; in contrast formative evaluation is usually associated with the testing of theories or improvement of a specific artifact or process.

4.2.4 Critical perspectives to design-based research

Design-based research is considered as a non-mature methodology by some researchers. It has been criticized for lack of clarity on methodological and epistemological aspects. Kelly (2004) and Dede (2004) provided some important criticisms of the current state of design research.

The lack of consensus is due, according to Bell (2004), to several factors, such as the background of the researcher, the need to bind research and theory, and the complexity of the educational enterprise. However, he argues that these disagreements and plurality of orientations and purposes to design-based research can be very productive given the complexity of educational contexts. He identifies four approaches that I have introduced in section 4.1.2. Bell states that

> it is more useful to consider design-based research as a high-level methodological orientation that can be employed within and across various theoretical perspectives and research traditions in order to bring design and research activities into a tight relationship in order to advance our understanding of learning-related educational phenomena (Bell, 2004, p.245).

On the other hand, Kelly (2004) states that design studies must develop from "a loose set of methods into a rigorous methodology" (p.116). He argues that design-based research has mainly been described by using

a set of process descriptors rather than as a set of procedures or steps to follow. In the same perspective, Dede (2004) argues on the necessity to establish some standards to decide when to begin an intervention and criticizes that the methodology currently lacks clear standards to help both researchers and practitioners decide if a given design should be abandoned or sustained. This issue has relevance because, due to its iterative nature, design-based research is very time consuming for both researchers and practitioners. He further argues that design-based research is currently "under-conceptualized and over-methodologized" (p.107). It is under-conceptualized because many experiments lack a solid theoretical base and do not seek to produce findings necessary for the refinement and evolution of theory (diSessa & Cobb, 2004) , and it is over-methodologized because, given the iterative nature of design-based research, the researchers usually use a variety of methods as interviews, observations and videos, so they end up collecting large amounts of data and "only the first five percent or so of the data collected were needed to induce the findings" (Dede, 2004, p.107). Another limitation related to this problem of data collection emerges in the data analysis. Frequently, researchers are "forced" to make a selection of data because there are usually not enough time and resources to analyze all the data collected (Brown, 1992; Collins et al., 2004)

In order to overcome some of these problems, I have located this research in a combination of two specific modes of design-based research (cultural psychology and cultural anthropology), with the objective of clarifying the purpose of the research, the followed process and how the findings can be understood. In addition, I will explain in section 4.3 which methods were used, in which stage of the research and for what purposes; as well as the conditions under which the data were collected and analyzed.

4.2.5 How does a design-based research process look?

Design-based research stills in the process of development. There is no general consensus on how to describe the procedure of performing design-based research. Reeves (2006) suggests a four-phase model (see Figure 4.1)

The first phase "Analysis of practical problems by researchers and practitioners" requires that researchers and practitioners work collaboratively towards the identification of real educational problems. The second phase "Development of solutions with a theoretical framework" entails the creation of prototype solutions based on existing design principles, literature review, and previous research. The third phase "Evaluation and testing of solutions in practice" refers to the

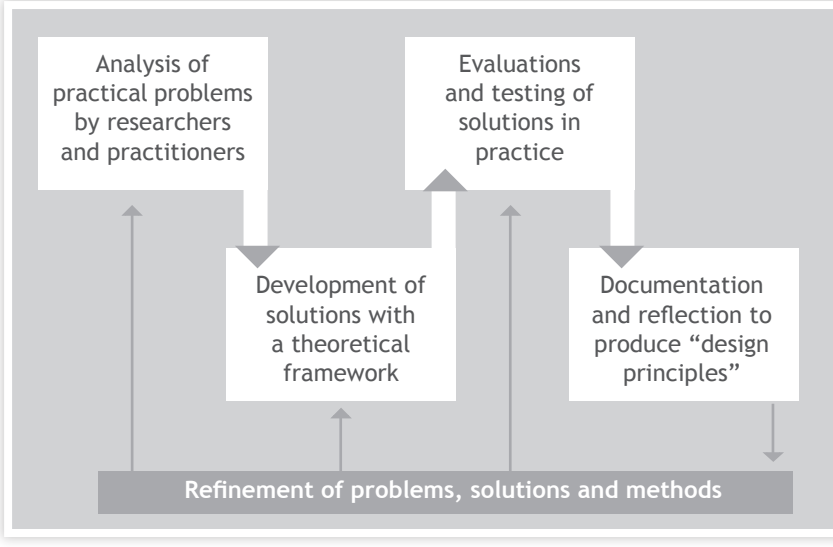


Figure 4.1 Design-based research diagram (Reeves, 2006, p.59)

iterative process of testing and refining design principles and prototype solutions; and the last phase "Documentation and reflection to produce design principles" concerns the retrospective process of reflection upon the design and its findings, where researchers refine, add, and discard principles that comprise their understanding of the experience (Reeves, 2006). In fact, the analysis is an ongoing process conducted throughout the intervention to support the participants' learning, and then in a retrospective way to place this learning and its supporting means in a broader theoretical framework.

As is shown in Figure 4.1, the model has a cyclical nature where each phase informs the next phase and, in turn, each phase can result in modifications of all the phases illustrating the iterative refinement nature of the approach.

Similarly, Bannan-Ritland (2003) proposed a general model "The interactive learning design (ILD)" with four phases: Informed Exploration, Enactment, Evaluation: Local Impact, and Evaluation: Broader Impact (see Figure 4.2).

The Informed Exploration phase is related with tasks such as problem identification, literature survey, and problem definition, with the goal to identify the users' needs and learning goals. The Enactment phase refers to the initial design of the intervention, the creation of a prototype, and the subsequent refinement of the design.

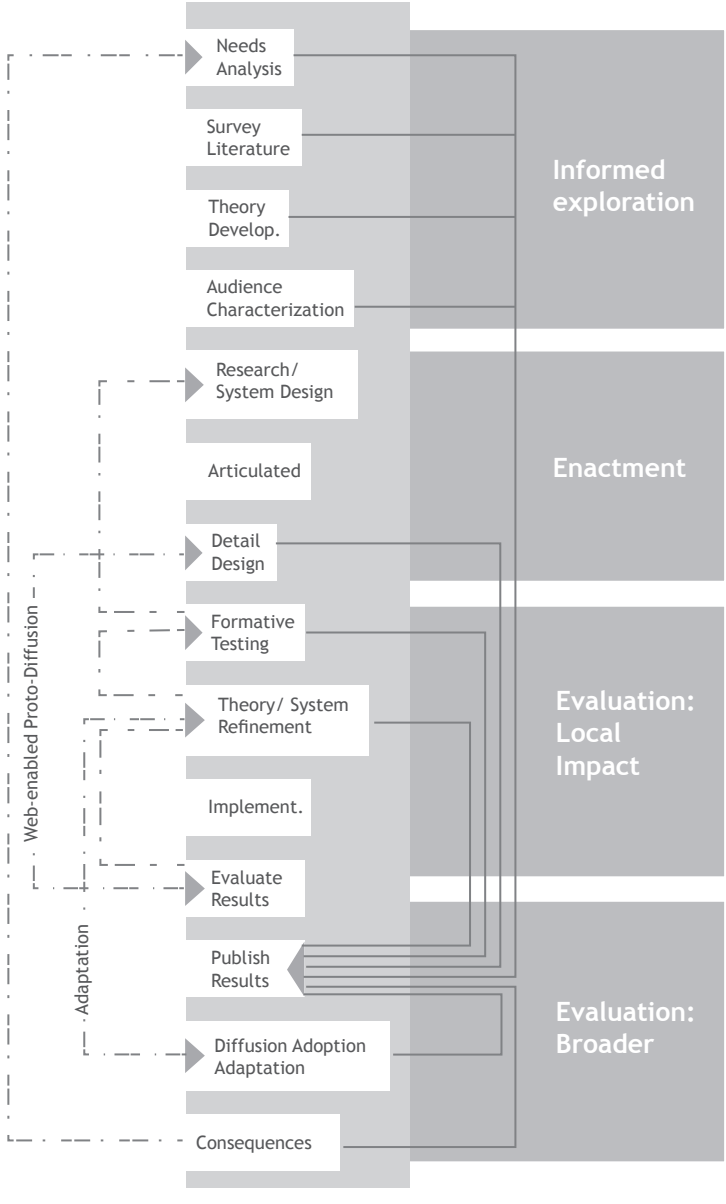


Figure 4.2 integrative learning design diagram (Bannan-Ritland, 2003, p.22)

In this framework, the evaluation has two stages; the first one is the evaluation of the local impact of the design on its target group. In this stage, the refinement process of the design can entail a returning to the Enactment phase. The second stage of the Evaluation phase seeks issues of ecological validity, dissemination and adoption in a broader context. This model proposes to use the Web to post the prototypes with the goal of getting feedback from unsolicited users that can inform the design (Bannan-Ritland, 2003).

The process guiding this study follows the model of Reeves (2006) but expands the model with a fifth phase "Dissemination and adoption in broader contexts" (Figure 4.3) that explicitly deals with the dissemination, adoption and sustainability of the educational intervention. This phase is already considered in Bannan-Ritland's model (2003) but it is missing in Reeves' model. The dissemination process should include both the practitioners and the scientific community; and the adoption and sustainability should address the question whether participants are able to make the innovation sustainable after the researchers have left the context (Fishman, Marx, Blumenfeld, Krajcik, & Soloway, 2004). The five phases are explained in the next section.

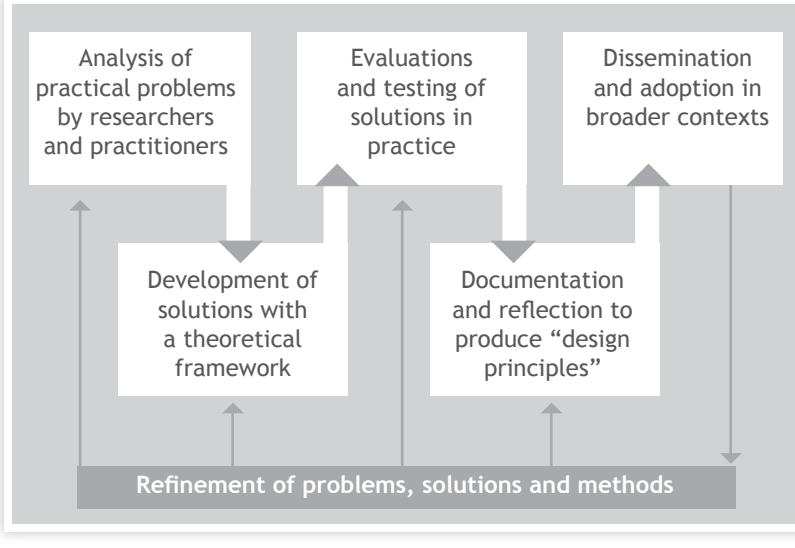


Figure 4.3 Extended design-based research diagram

4.3 Using Design-based Research to Guide the Research Process

In this section, the criteria for selecting design-based research as the methodology to guide this research are explained. The research design strategy is presented in five phases, and for each one the methods used to generate data, and the context in which the methods were used are discussed.

4.3.1 The rationale for selection

The research proposed in this thesis seeks to understand how a professional learning environment designed under the theoretical framework of communities of practice can foster teachers' change of beliefs and attitudes towards teaching, enabling a transformation in teachers practice through the use of POPP and ICT.

As it was explained in chapter three, UNA through its professional development system seeks to promote changes in teaching practices, but given the geographical conditions of teachers from the regional campuses, and the difficulty for UNA to reach those teachers and vice versa, an opportunity to develop new approaches to face the situation was seen in this study. In this sense, design-based research provides the possibility to study "what could be"; designing an alternative approach for teachers' professional development in UNA and understanding the potential of this social learning framework in practice.

Using design-based research as an inspiring methodology is considered most suitable for the purpose of this research for several reasons. Firstly because the project entails a design goal focus on the dual objectives of developing a new approach for teacher professional development at UNA "while at the same time constructing a body of design principles that can guide future development efforts" (Reeves, 2000, p.7). Secondly, because design-based research methods have been recommended, in a recent report "A Research Agenda for Online Teacher Professional Development", as one research model that offers a "best practice stance that has proved useful in complex learning environments, where formative evaluation plays a significant role" (Dede, Jass Ketelhut, Whitehouse, Breit, & McCloskey, 2006).

Thirdly, because incorporating design into the research activities allows researchers to gain an impact on education and at the same time advance their understanding (Edelson, 2002). In this research, it is considered very important to contribute to developing UNA-models for teacher professional development, and at the same time, get a better understanding of the dynamics between ICT, POPP, professional

development and communities of practice. Furthermore, design and the idea of iteration and continuous processes of refinement are fundamental in the process of understanding how the community develops practices; what are the discrepancies between the intended design and the emergent usage of it; and how to modify the intervention to make learning more efficient (Sandoval, 2004).

Lastly, another element that engages me in this research approach is its "socially responsible" approach, as defined by Reeves et al. where they argue that design research requires that researchers "1) explore significant educational problems, rather than conduct research for its own sake; 2) define a pedagogical outcome and create learning environments that address it; 3) emphasize content and pedagogy rather than technology; 4) give special attention to supporting human interactions and nurturing learning communities; 5) modify the learning environments until the pedagogical outcome is reached, and 6) reflect on the process to reveal design principles that can inform other instructors and researchers, and future development projects" (2005, p.109-110).

4.3.2 Research Design Strategy

A research design strategy is the broad plan of action for how the researcher intends to answer the research questions (Denzin & Lincoln, 2003). This section presents the research process, and the methods used to construct and analyze the data. Since the design-based research approach guides the entire research, I decided to use its framework as a point of departure to explain the methods used in each of the five phases of the extended model (Figure 4.3):

- Phase 1: Analysis of practical problems by researchers and practitioners
- Phase 2: Development of solutions with a theoretical framework
- Phase 3: Evaluation and testing of solutions in practice
- Phase 4: Documentation and reflection to produce design principles
- Phase 5: Dissemination and adoption in broader contexts

As stated previously, design-based research allows the use of multiple data sources and data collection techniques such as interviews,

observations, and questionnaires. In particular, this study uses multiple methods, combining participant observation and analysis of online documentary material with co-located meetings, questionnaires and participation in co-located workshops.

Figure 4.4 displays the timetable for the research phases. Table 4.2 summarizes the data collection instruments, the phase of the research in which the collection took place, the target group, the dates and the person responsible for administrating the instrument. The collection and analysis of data occurs simultaneously with the design, implementation and analysis of the educational intervention, in the sense that each instrument informs the next one. In the following, each instrument and its applicability to the research within the related phase is discussed.

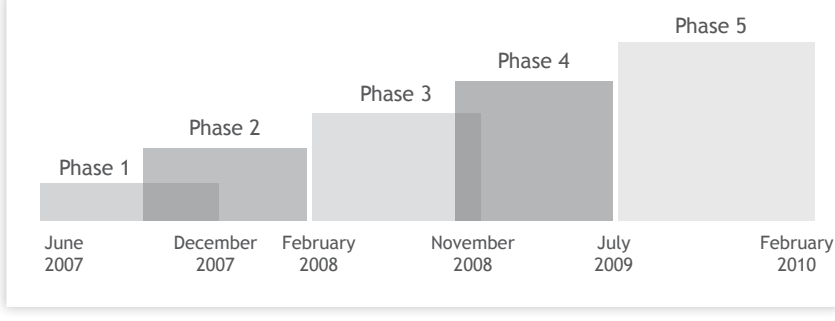


Figure 4.4 Timetable - phases of the research

Instrument	Phase of the research	Target group	When	Administered by
Focus group	First	UNA teachers previously involved in the course Educational Innovation	December 11th, 2007	Facilitator and research observer
Questionnaire #1: Teachers profile	First	Future participants	November – December 2007	Facilitator
Participant online observation	Third	Participant teachers	Throughout the whole intervention (February – November 2008)	Researcher

Instrument	Phase of the research	Target group	When	Administered by
Interviews	Third	Selected Participant teachers	March 24th, 26th and 28th, 2008	Supervisor
Questionnaire #2: Mid-term	Third	Teachers participating in the first global, co-located meeting	June 25th, 2008	Facilitator
Observations: recordings co-located meetings	Third	Teachers participating in the first and second global, co-located meeting	June 25th, 2008 November 10th, 2008	Facilitator and research observer
Workshops	Third	Participant teachers	October 1st, 2nd, 3rd and 9th, 2008	Researcher
Questionnaire #3: Final-term	Third	Teachers participating in the second global, co-located meeting	November 10th, 2008	Facilitator

Table 4.2 Data collection instruments

4.3.2.1 Phase 1: Analysis of practical problems by researchers and practitioners

In this phase, the identification of the problem takes place. It requires that researchers and practitioners work collaboratively towards the identification of real educational problems. The research context, the practitioners' problem (UNA-Virtual) and its evolution to a research problem were explained in chapter three. In this section, I limited my discussion to the methods used for data collection and analysis in this phase.

Once the problem was established, the next step was to consider the sources of information that would inform the design of the proposed intervention. From the literature, we[1] draw mainly on communities of practice theory and professional development for university teachers, as

1 The researcher and the facilitator from UNA-Virtual

well as on literature about POPP and ICT (see chapter 2). From UNA's previous experiences, besides the knowledge and experience of the UNA-Virtual team, we deemed it important to incorporate the experience of the academics who were previously involved in the course "Educational Innovation". For this purpose, we planned a focus group in order to learn about the teachers' experiences.

Focus group: Focus groups are a meaningful way to generate data by interacting with people (Mason, 2002). Focus groups bring together a specifically chosen group of people to discuss a particular theme or topic. They are a form of group interview, but the participants interact with each other rather than with the interviewer. That is, while a group interview involves interviewing a group of people at the same time, with questions and answers between the interviewer and the participants, a focus group relies on interaction within the group. In a focus group, participants give their own opinion, but also listen to what other people have to say, and in the light of the new information they can refine their point of view. Participants can ask questions to each other and comment on what they have heard (Finch & Lewis, 2003). "It is from the interaction of the group that the data emerge" (Cohen, Manion, & Morrison, 2003, p.288). As in interviews, focus groups vary in the extent of their structure, according to the researcher's needs.

Focus groups are useful in situations where it is important to: obtain several perspectives about the same topic in a short time; explore the degree of consensus on a given topic; gather rich data through the words of the participants; allow interactions among participants; and to provide opportunities to the participants to re-evaluate and reconsider their understanding on particular experiences (Gibbs, 1997; Mason, 2002; Saunders et al., 2000). They also are useful for triangulating data with more traditional forms, such as interviewing, questionnaires and observations (Cohen et al., 2003). Some disadvantages in using focus groups are: individuals dominating the discussion; the experience can be intimidating for some participants; it is necessary to have a competent moderator; and researchers have less control over the data produced (Gibbs, 1997; Saunders et al., 2000).

The objective of the focus group was to learn about teachers' experiences within the course "Educational Innovation", because this course shares some similarities with the envisioned educational intervention. The design of the focus group was a collaborative effort between UNA-Virtual and the researcher. Six teachers were invited to participate in the focus group. They were selected

by UNA-Virtual, considering their different backgrounds, the motivation that they showed during the Educational Innovation course, and their willingness to innovate their teaching practices. In the end, five teachers attended this meeting. The facilitator was the moderator of the focus group, and she had the support of an observing researcher who took notes. First, teachers were informed by the moderator about the project and their role in informing its design through their previous experiences. Then the discussion was oriented towards the relevance of the course for teachers' practice, activities and their usefulness, positive and negative aspects of the experience, development of relationships between participants, and suggestions for intervention (see Appendix A). The meeting was video-recorded by UNA-Virtual, and then facilitated to me for the posterior analysis.

In this phase of the research, it was also considered important to develop a profile of each participant. Given the distributed location of teachers and the period of the year (Christmas holidays), we decided to use a questionnaire to get an initial understanding of the participants' profile and their expectations about their potential participation in the project.

Questionnaires: Questionnaires are a very structured means to collect information from people. The researcher determines the questions that she wants to ask, as well as the range of answers that can be given by the respondents (Gillham, 2000). Questionnaires can be composed of closed and open questions. A closed question is one where the possible answers are predetermined, and an open question gives more freedom to the respondents to answer. There are some advantages and disadvantages in using questionnaires (Cohen et al., 2003; Gillham, 2000; Saunders et al., 2000). Among the advantages are: low costs in time and money; easy access to information from a lot of people; the answers to closed questions are ready to be analyzed; it is possible to respect the anonymity of the respondents; and the lack of interviewer bias. As disadvantages, we can mention: problems of data quality (seek information just by asking questions); problems of motivating respondents (response rate is low); often people talk more easily than they write; it is impossible to check seriousness or honesty of answers; and there is a risk in the quality of the questions (Gillham, 2000; Saunders et al., 2000). Questionnaires by themselves are not always considered an adequate method of research. They need to be combined with other methods that provide different kinds of data; however they can be useful in illuminating the problem under research (Gillham, 2000).

In this study, questionnaires were used at three different points in the intervention. They were designed and developed together with the facilitator. The first one, corresponding to this phase, was sent by email to the participants and it was semi-structured with select-response questions and open-ended questions. Questions were divided in four sections: personal information; technical infrastructure available for the teacher; prior experiences with: online environments, use of educational technology and POPP; and expectations and suggestions for the learning experience (see Appendix B). Thirty-one interested teachers responded to the questionnaire. The information obtained from these questionnaires allow us to have a more comprehensive picture of the target group, including the teachers' technical and academic profile, as well as the technological infrastructure available for their participation in the project (personal computer, access to internet, etc). The information from this questionnaire was analyzed by the researcher and subsequently shared with the facilitator.

4.3.2.2. Phase 2: Development of solutions with a theoretical framework

In the second phase, a theoretical solution is developed, from existing theories, models or principles that have been evaluated for their suitability. The developed model should be practically useful and should be able to explain how the theoretical principles work in practice and how practice affects theory. Chapter five describes how the theoretical and practical solutions were developed. Development begins with a literature search to identify existing models that can be used to propose the preliminary set of design principles. In addition to the literature, previous UNA-Virtual and university teachers' experiences were also considered. The literature review was presented in Chapter two, and the initial design principles and guidelines to design the learning environment are explicated in chapter five.

4.3.2.3. Phase 3: Evaluation and testing of solutions in practice

The third phase is the testing and refinement of the principles in the real context. The learning design is evaluated and modified iteratively. Since the principles are tested in a real-world environment, there are many variables that could affect the design. Both, failures and successes need to be documented, as they both promote a better understanding of the relationship between the theory and the context

(Design-Based Research Collective, 2003).

The iterative phase involves testing and refinement of the design guidelines and the learning design. This was carried out in the context of a community of practice oriented program for professional development of university teachers during ten months, from February to November 2008. The participant teachers came from five geographically distributed campuses and had diverse fields of knowledge. Given the geographic location of the teachers, the distributed community of practice (UNAgora) has a strong online component. As centre of "online meeting" a space was created under the Moodle platform (Modular Object-Oriented Dynamic Learning Environment). However, in order to create an atmosphere of confidence among the teachers, six co-located meetings were held during the project period. Two of them were "global" meetings involving all the participating teachers and the other four meetings were localized workshops carried out in each campus. This implementation is described in chapter six along the refinement process of the design guidelines and learning environment. The outcomes of this phase are the refined design principles. The analysis of the intervention is presented in chapter seven and the analysis of the design is presented in chapter eight.

This phase of the research is the richer phase regarding the amount and relevance of data collected. Multiple methods were used to generate data with the goal of gaining a better understanding of the designed environment, the university teachers' learning experiences and the conditions that affect they participation. In a qualitative approach, the researcher makes knowledge claims based primarily on meanings of individual experiences that are socially and historically constructed (Creswell, 2003).

The main sources of data in this phase were: co-located meetings, online discussions, and reflection workshops. The information was collected through questionnaires, interviews, workshops and participant observation. In the following, each kind of data and the conditions under which they were produced is described. Explanation of how the data was analyzed is explained in section 4.4.

In the early beginning of this phase, semi-structured group interviews were prepared for investigating teachers' beliefs about ICT, POPP, expectations and initial thoughts about the community.

> **Interviews:** Interviews in qualitative research are particularly useful for understanding people's experiences and self-understanding about their lived world. Semi-structured interviews can be considered as a social construction process (Kvale, 1996). In semi-structured interviews, a schedule is prepared but it

is sufficiently open-ended to enable the researcher to change sequences, re-order the content, and include new questions to undertake further searching (Cohen et al., 2003).

Group interviewing is a useful way of conducting interviews. Watts and Ebbutt (1987 cited in Cohen et al., 2003) outline the advantages and disadvantages. The advantages include the potential for discussion to develop, thus obtaining a broader range of responses. The authors explain that group interviewing is useful where a group of people have been working together for some time or common purpose, or where it is considered important that everyone be aware of what others are saying. Group interviews are often quicker than individual interviews; they save time and, for some target groups, they can be less intimidating than individual interviews. Among the disadvantages, the authors cite that in group interviewing there is little space to allow personal matters to emerge, and that is not useful if the researcher wants to follow-up with a series of questions to one specific member of the group.

In this study, the interviews were carried-out in the beginning of the project, four weeks after the first interaction with the teachers. They took place in three different regional campuses immediately after a workshop about the POPP-approach (see Appendix C). The interviews were semi-structured group interviews. In each interview three teachers participated; they were selected using diverse criteria: a) Teachers who speak English, b) Teachers who have the role of coordinators for the project in each campus, and c) Academic Directors of the regional campuses. The interviews were designed for the researcher, but carried-out by Professor Lone Dirckinck-Holmfeld, my supervisor, who was in Costa Rica at that time. They were conducted in English with a translation support for teachers who did not speak English. The interview had three guiding questions (Appendix D) and the interviewees took turns to answer each question. Each interview lasted around 1 hour. They were video recorded and subsequently transcribed for analysis. In spite of the translator, the language was a limitation in these interviews, and therefore it was difficult for the interviewer to go deeper into the issues on the agenda. However, the interview served as a platform for the participants to present their beliefs, experiences, views, ideas and imaginations for the integration of ICT and principles of communities of practices.

As it was commented before, in this study questionnaires were used at three different points in the intervention. The first one

corresponding to the first phase was explained in section 4.3.2.1; the other two questionnaires were administered in this third phase of the research.

Questionnaires: one of the advantages of using questionnaires is to reduce the bias of the researcher. Another advantage of questionnaires is that they can guarantee confidentiality. In this particular kind of study where the research context is designed by the researcher, where I was always visible in the learning environment, and where each posting in the online environment is related to a particular participant teacher, it was considered important to give some anonymity to teachers, thus enriching the qualitative data obtained from the other data collection instruments.

One disadvantage in using questionnaires is that responses could not be probed and explored further but, in this case, this disadvantage is of low importance. The long-term engagement with the participants and the open dialogue with them through the online platform, co-located meetings and workshops allow us to reflect and explore with the teachers the information obtained from the questionnaires.

In this phase, two questionnaires were used to explore the teachers' perceptions about the designed learning environment. The first questionnaire was applied at the end of June in the first co-located meeting with 17 participating teachers and four months after the beginning of the project. The questionnaire was designed to: 1) learn about the teachers' thoughts on the learning environment: organization, methodology and activities, and 2) explore the teachers' reflections on their learning process; participation and level of mastery of the virtual classroom tools (see Appendix E). The second questionnaire was applied in November, in the last co-located meeting. In this meeting, 15 teachers participated, five of them by videoconference from Nicoya regional campus. The questionnaire shares some similarities with the first questionnaire but had a stronger focus on the teachers' participation; learning and identification with the community (see Appendix F). Both questionnaires were designed jointly with UNA-Virtual. They were structured as closed questions with additional open spaces to invite teachers to comment in, and both were completed by twelve teachers. Not all teachers completed the questionnaires because it was applied at the end of the meetings when some of them have left. The questionnaires were analyzed using an excel spreadsheet and the results were shared with teachers through the online platform.

In this investigation, online participant observation formed a major part of the research process. Given the strong online component of the intervention analyzed here, over a period of ten months, online observation was carried out almost on a daily basis.

> **Participant observation:** Participant observation is a qualitative method whose objective is to generate understanding of the multiples perspectives within any given community (Mann & Stewart, 2000). It requires that the researcher engages in a prolonged period of time in the community or group to be studied. Participant observation includes activities of direct observation, document analysis, reflection, analysis, and interpretation (Schwandt, 1997 cited in Mann & Stewart, 2000).

Observing and participating in the natural setting can generate knowledge of the social world that is not possible to obtain through other means such as interviews or questionnaires (Mason, 2002). In this research, observation and participation were fundamental for the understanding of the teachers' values, beliefs and experiences. In addition, by the nature of the design-based research approach, researchers are "participant–observers who deliberately intervene in the settings they study" (Hoadley, 2004, p.3). In order to understand the meanings that participant teachers give to their online participation in the community and the generation of knowledge that emerges from their interaction, I spent ten months participating/observing what the participants do online. Furthermore, the chosen methodology demands a close interaction with the participants and with the designed learning environment in order to be able to continuously evaluate and refine the design.

In offline settings, observation involves watching people, but in online research, observation involves watching text and images on a computer screen (Garcia, Standlee, Bechkoff, & Cui, 2009). Because participants in this study communicate mainly through online means, the online environment provides me direct contact with the participants and the opportunity to understand teacher interactions with content, other colleagues, the facilitator and with the technological platform. In addition, by reading comments in the academic discussion, I could form an opinion of the added value that these discussions had for the learning experiences of teachers. The textual data available for participant observation research include postings in discussion forums, e-mails, chat room interactions and produced artifacts.

Since the beginning of the project, the teachers were aware

of my presence in the online environment as a researcher. They consented to be part of the research project and had no reservation about the use of collected data for academic purposes. Although I was always present in the online setting (either as designer, researcher or participant), my active participation in the ongoing dialogue was limited to conversations in chats, in the "informal" discussions, and in the reflective forums. I did not participate in discussions related to more academic or subject-oriented matters, in order avoid creating confusion between my role and the role of the facilitator.

The contributions from teachers in the online learning environment were read and included in the analysis. A preliminary analysis was carried-out along the way with the data collection process and the initial findings were shared with the participants through a discussion forum created specifically for this purpose.

In August 2008, after seven months of having initiated the project, and after having conducted a preliminary analysis, and found that the technology was still a barrier for the effective communication of some teachers, it was agreed with my supervisor the relevance of establish a face-to-face communication with the participants in their own local contexts. Thus, a trip to Costa Rica was planned in September 2008 to carry-out a series of workshops.

Workshops: A workshop is an effective short-term method for learning. They are flexible and cost-effective methods and can be easily designed or modified to meet the needs of different target groups and learners (Brooks-Harris & Stock-Ward, 1999). The authors identified five kinds of workshops: problem solving, skill building, increasing knowledge, systemic change and personal awareness or self-improvement, and four types of activities, (inspired on Kolb's Experiential Learning Cycle) to carry-out: reflecting on experience, assimilating and conceptualizing, experimenting and practicing, and planning for application. According to Doppler and Lauterburg, workshops are key events in the context of innovative processes, they form part of a developmental process with a before and an after, they take place outside the normal routine of activities and their goal is to develop results that can be implemented (2001, p.253, emphasis in the original).

In the context of the project, four workshops were designed and implemented in the final phase of the intervention, after 30 weeks of the beginning of the project. The workshops were developed with both the goal to establish a meaningful dialogue

among participant teachers and researcher, and to provide teachers with: 1) a place of engagement in the negotiation of meanings, materials and experiences to facilitate reflection, and 2) opportunities to make their thoughts and actions matter through a process of self-design of the community (Wenger, 1998). These workshops were the only face-to-face contact that the researcher had with the participating teachers, and they were not initially considered in the design of the intervention. The decision to travel to Costa Rica to work directly with the teachers was considered important in order to get a better understanding of teachers' experiences as members of the community of UNAgora.

In a previous analysis of the teachers' experiences which was mainly based on the produced online dialogue, I found it important to address four themes in these workshops: community formation, identity trajectory, classroom innovation experiences and the self-design process of a community. The workshops were focused on the teachers' reflection (Schön, 1983) through their engagement in non-traditional activities for university teachers such as building metaphors with Lego bricks, telling stories and making drawings. The reasons for choosing these activities and tools were twofold; first to create an informal and relaxing environment for dialogue, and second to be consistent with the focus of the study on innovation, offering the teachers new ideas about ways to establish meaningful learning environments.

The workshops were designed jointly with a PhD peer that was in Costa Rica at that time, and she also took part in three of the four workshops. All of them had duration of about three hours and took place in four different regional campuses. Given the scarce time of the teachers, it was decided to address one different topic with each group instead of addressing all four aspects with all the groups. This decision allowed the researcher to focus on each topic and get deeper into it, but with the cost of not having a broader discussion with more perspectives over each topic. The workshops also provided an opportunity to carry out informal conversations with the teachers, contributing to my background understanding of their working conditions and context. Even when each workshop has an agenda to follow (see Appendix G), the intention was to get the teachers to talk and to reflect on their experiences and on their responses to the workshop activity (produced artifacts: Lego models, stories, drawings). The workshops were fully sound recorded and partially video recorded, and subsequently transcribed for analysis.

4.3.2.4. Phase 4: Documentation and reflection in production of design principles

The fourth phase is the production of a solution that has been tested and refined in the context of use. The retrospective analysis aims to obtain overall insights about the interaction between the intentional design, the participants and the institutional contexts, as well as it aims to produce design principles that can place the findings in a broader context. The design principles and how they were elaborated are presented in chapter five. Chapter 8 deals with the analysis of the design and the refinement of principles and guidelines.

4.3.2.5. Phase 5: Dissemination and adoption in broader contexts

The final phase is not considered in Reeves' model (2006), however it was considered important to add this phase to the process because: 1) the communication of the findings to both practitioners and the research community should be considered central parts of the intervention, and 2) as Fishman et al. (2004) state, design-based researchers need to consider external factors that are necessary for the innovation support. They argue that it is necessary to address issues of scalability and sustainability if researchers hope for their innovations to have a broader use beyond the original research context.

In this study, the sustainability of the educational intervention was a goal since the beginning and, as such, during the intervention period, a sustainable strategy was designed and discussed jointly with UNA-Virtual and with participant teachers through online discussion forums and activities in the co-located meetings and workshops. The analysis of these results and the ongoing process to make the intervention sustainable is discussed in chapter 10.

4.4 Data Analysis

As part of the research process, multiple methods were used to construct data, such as interviews with teachers, participant observation, questionnaires and reflection workshops. Data sources include online dialogue, recordings of co-located meetings, examination of design documents and examination of teacher pedagogical projects. The goal of using these multiple sources of data is to build a story that shows the dynamics of building a community-oriented professional development model through which university teachers seek to innovate

their practices.

The different sources of data are summarized in Table 4.3, with an explanation of its advantages and disadvantages for this investigation.

Source of data	Advantages	Disadvantages
Focus group (video and summary)	Allows capture of university teachers' experiences with a previous course on ICT and learning	------
Questionnaires	Easy to administer and analyze. Allow for some concrete information especially important for the institution point of view.	Not all the teachers completed the questionnaire
Interviews (video and transcripts)	Understanding of teachers' beliefs about ICT, POPP, working conditions and expectations	The language was a limitation in going deep in some issues
Online communication (text messages)	Keeps track of participant discussions and their response to online activities without manipulation of the data	Extremely time consuming to read through the postings almost every day.
Observations: recordings of co-located meetings (video and transcripts)	Allow for observation of teachers' interaction and participation in co-located meetings	The transcription of discussions for analysis is time consuming
Workshops (field notes and transcripts)	Teachers reflected on their experiences and expressed their feelings, expectations and difficulties. Contributed to a clear understanding of the their experiences	The transcription of discussions for analysis is time consuming. Cost expensive (travel to CR

Table 4.3 Sources of data: advantages and disadvantages

As a result of the multiple methods used to generate data, and the long duration of the intervention, a large amount of data was generated for analysis. Through the intervention, rich sources of data were generated with methods that were part of the learning and social

interactions in the professional development activity. Data generation methods captured teachers' beliefs, feelings and responses while they were dealing with new concepts, experiences and learning environments. The qualitative findings from this combination of multiple methods provided: a) some support for the teachers' change in beliefs about their roles; b) support for the teachers' change in attitudes towards their practice, mainly regarding the introduction of technology in their practices; and c) evidence of trends in the generation of alternative learning environments.

The generated data has very distinctive characteristics. Some of them were generated in off-line settings such as co-located workshops and others in online settings such as participation in discussion forums. Some of them were generated through structured methods such as questionnaires, other from semi-structured methods such as interviews and focus groups, and others from open-ended methods such as the conversations in chat rooms. Some data was generated by asynchronous means and other by synchronous ways. Furthermore, I acknowledged the special features of online interaction. Henry (1992) states, that despite the fact that this kind of communication mainly takes the form of a written text, it does not share the same features as traditional, written communication, but they contain characteristics of spoken communication.

> *Online conversation is a new hybrid that is both talking and writing yet isn't completely either one. It's talking by writing. It's writing because you type it on a keyboard and people read it. But because of the ephemeral nature of luminescent letters on a screen, and because it has such a quick - sometimes instant - turnaround, it's more like talking (Coate, 1997, p.165-166).*

In the case of offline meetings, the sessions were video recorded by UNA Virtual, enabling me to inspect the interaction and dialogue among the teachers, even though I was not participating directly. Video also had the advantage of provides the possibility of repeated inspection of the recorded materials. After watching the videos, I personally transcribed all but one tape - the focus group-. By doing the data transcription, I gained a better understanding of the content of the conversations and the opportunity to reflect upon the context of the meetings. In the cases of the focus group video, I heard the records several times and took notes on important issues brought on by teachers that were important to consider in the design of the intervention.

The questionnaires were administered by UNA-Virtual. They also collected the answers and tabulated the data of the second and third questionnaire. Regarding the first questionnaire, they sent me the questionnaires from the teachers by email and I analyzed and

synthesized the information in a spreadsheet. This document was shared with UNA-Virtual and it contributes to inform the preliminary design of the intervention.

In the case of online interaction, the data included all messages in the learning environment, which were automatically archived by the Moodle system and could be retrieved later for analysis. The postings are preserved in their original, hierarchical structure, so it is possible to follow the development of ideas within a particular topic. Data from the Moodle system include the text of each message, the thread where the message was posted, the date and name of the participant teacher.

In summary, I transcribed all recorded sessions (co-located meetings, interviews, workshops) for later data analysis. Online forum discussions were downloaded into text files for analysis. What I mean by transcription is that the data was written using the teachers' own words but I did not write in pauses and dubitative sounds as hmm, eehhs, etc. They were not considered important for the objectives of the research.

Especially important for the study were the reflection spaces, whether online or offline, because, in these spaces, teachers expressed their feelings, expectations, difficulties and successes. The reflective writing by the participants provided opportunities for me to try to make sense of their experience while they in turn were trying to make sense of it themselves.

In connection with the transcriptions, Campbell (2006, cited in Garcia et al., 2009) argues that "what participants write conveys important information about their identity, presentation of self, and how they define and perceive their world" (p.61). Thus, the writings of the participants should be transmitted to the readers exactly in the way they were written, with no corrections in spelling, grammar or punctuation and with no standardization of fonts (Markham, 2004). In this study, the teachers' opinions are written and spoken in Spanish. I did the analysis and categorization of the information partially in Spanish and partially in English; the identification and grouping of meaningful concepts were carried-out in Spanish, but the label of categories and the subsequent analysis were conducted in English. Afterwards, I translated some selected quotations from Spanish to English in order to support the findings and to give the readers a sense of the teachers' experiences.

A widely used framework to analyze communication via text-messages is content analysis (Henri, 1992). Hara et al. (2000) use content analysis as a generic name for the process of comparing, contrasting and categorizing data. This study uses this definition to analyze discussion transcriptions of the UNAgora community and determine if this social grouping can be a source of continuous professional development for

UNA teachers.

In order to interpret and capture the meaning from the data, all the source material was analyzed through the following process (Creswell, 2003; Kvale & Brinkmann, 2008):

1. Getting a sense of the whole: the transcriptions were read several times to obtain a general sense of the information and its general meaning.
2. Identifying meaningful concepts: the teachers' meaningful statements were identified and abbreviated, thus larger portions of text were condensed and made more concise.
3. Grouping meaningful concepts: in this phase the researcher grouped phrases with similar elements and characteristics. For example, the postings "some of us only have few hours to participate" and "my main problem have been lack of time" were grouped together.
4. Naming the groups: the groups of concepts were then given labels or codes that distinguish and describe them. The codes emerged from the data as I read through the transcripts. For example, the previous two postings were categorized under the code "Time". An example of using a more general descriptive approach is the posting "my lack of understanding of the platform" which was coded as "technical expertise of academics".
5. Interrogating the data: the codes were analyzed in terms of how well they inform the purpose of the thesis and the research questions, thus they were grouped into networks, resulting in theme groups. These theme groups are reported as 1) benefits of participating in the community, 2) factors that play a positive role in teachers' participation, and 3) factors that play a negative role in that participation. Following the above example, "Time" was identified as a factor that plays a negative role in teachers' participation in the community (see Appendix H). In chapter 7 the theme groups are presented, and in chapter 9 they are discussed in relation with the research questions.
6. Writing a coherent story: the categories or themes were examined to interpret and discuss their relationships, with the aim to construct a meaningful, coherent and non-redundant description of the phenomenon under study.
7. Synthesizing design principles: the final step is to offer design

principles based on the insight gained from the data. These principles are presented in chapter 8.

Although these steps suggest a linear process, the work of analysis requires a movement back and forth between the whole and parts of the text. The quality of interpretation in this thesis is based on a systematic and transparent analysis, and the interpretation has been discussed with other researchers and colleagues in the field. However, the analysis process always presupposes that there are multiple meanings in any text, thus the interpretation presented in this thesis is influenced by my understanding of the phenomenon.

In this study, I am researching what Mann and Stewart (2000) call a "familiar" culture. That is, that I am myself a university teacher in the same cultural context (UNA). This cultural background knowledge contributes to my process of interpretation. My local knowledge about UNA and about what it is like to be a university teacher, means that in a certain degree, I have a high level of shared cultural understanding with the participant teachers. Even though I have not worked in a regional campus, this frame of shared knowledge, enables me to draw on the various perspectives that the participating teachers bring as consequence of their age, status (permanent, contract, part-time, full-time), field of expertise, gender and so on (Mann & Stewart, 2000). On the other hand, as the methodological literature also stresses (Miles & Huberman, 1994), this familiarity may also have made me "blind" to routine practices and implied less inquiry and questions into the explanations from the participants.

4.5 Participants

The participants of this study are formed by two groups: the participant support group from UNA-Virtual, and the group of 27 university teachers from UNA. An overview of the roles and tasks of the participant group from UNA is shown in Table 4.4.

The 27 participating teachers come from five different, regionally distributed campuses, and have different backgrounds and years of teaching experience, as it was introduced in chapter three. Their participation in the project was voluntary as responses to an open invitation made by UNA-Virtual to the Director of each regional campus. However, during the period of the intervention, we negotiated with UNA the aspect of certificating the teachers' participation in the project, so this became an external motivator for them.

Participant role	Institutional department and position	Tasks
Facilitator	UNA-Virtual - Adviser in Education and Technology	- Invitation to potential participants. - Facilitation of the focus group. - Collaborative design of the educational intervention (activities, resources and organization) - Facilitation of online dialogue. - Set up of the co-located meetings. - Facilitation of the two globally co-located meetings and of three locally co-located meetings. - Administration of questionnaires and tabulation of two of them. - Summarizing of meeting activities and participation. - Participation in the design of the sustainable strategy for the community
Observer	Informatics School – University teacher and researcher	- Taking field notes on co-located meetings. - Shared writing of mid-term reports. - Participation in the design of the sustainable strategy for the community
Technical support	UNA-Virtual - Technology Manager	- Recording of co-located meetings and interviews. - Preparation of videos to be uploaded in BSCW. - Technical support for Moodle platform and UNA Virtual Classroom. -Elaboration of a video with the teachers' trajectory in the community.
Administrative support	UNA-Virtual - Coordinator	- Link between the project and institutional authorities. - Partial participation in the two globally co-located meetings. - Participation in the design of the sustainable strategy for the community

Table 4.4 UNA participants: roles and tasks

4.6 Researcher Role

The researcher in design-based research has a double role as designer and researcher (Barab & Squire, 2004), but besides these, I adopted many different roles at different phases of the research process including those of participant, facilitator and coach.

As participant, I was another UNA teacher sharing many of the

community members' expectations and concerns. I took part in many chat conversations and reflection discussion forums sharing my views and opinions. I was present through video-conference in some of the co-located meetings.

As facilitator, in the online setting, I facilitated some of the discussions in the meta-reflection forums, (most of the discussions were facilitated by the community facilitator). For both settings (offline and online) I always participated in the agenda for the discussions, the logistics of setting up the meetings as well as summarizing points and preparing questions to promote further discussion and reflection during meetings.

As coach, I helped the community facilitator, providing personal online sessions to assist participants in how to navigate in Moodle, in how to participate and create a forum, chat, and in how to upload a file, and so on. In general, I supported teachers in technical aspects involving participation.

Besides the different roles, my role as researcher was always central. For the other members of the community, I was always the researcher, and this role shapes the interaction and relationship between the community members and me. All the assumed roles during the project had directly influenced the activities of the research, thus the interpretations of the findings.

4.7 Ethical Considerations

This section describes how ethical issues in the conduct of the research have been addressed.

Informed consent involves ensuring that the participants have a clear understanding of the purpose of the study; who is conducting the research; how the data will be used; and what participation will mean for them (Ritchie & Lewis, 2003). Here, informed consent entails informing the participants about the purpose and main characteristics of the study and possible risks and benefits from their participation. It also involves obtaining the voluntary participation of the participants, with their right to withdraw from the study at any time (Kvale, 1996).

In order to have access to the participants in this investigation, we follow a process required by the institution (UNA): 1) A proposal of the institutional project "Creación de una Comunidad de Práctica en línea para el Desarrollo Profesional del Docente de las Sedes Regionales de la Universidad Nacional de Costa Rica" were jointly written with UNA-Virtual; 2) An invitation letter to participate in the project was sent by

UNA-Virtual to the Directors of the Regional Campuses in October 2007. Attached to the invitation was a draft of the institutional project for revision and for observations. The received suggestions were integrated in the proposal and then presented again to the Directors in order to be approved; 3) Once the Directors of the regional campuses agreed to participate and approved the institutional project, each Director invited their local teachers to participate and sent the list of interested teachers to UNA-Virtual. At the same time, each Director appointed one teacher to be the local coordinator; 4) UNA-Virtual e-mailed a letter in December 2007 to each potential participant explaining the project and requesting some personal information; 5) The potential participants were invited to a co-located meeting in February 2008 (Appendix I). Three meetings took place at different regional campuses where the project was explained by the facilitator. She clarified doubts, answered questions, and explained the expected participation from teachers. At the end of the meeting, the teachers were asked to sign the informed consent form in which they agreed to participate in the research project. This consent form is included as part of the Appendix I.

Participation in the project was voluntary and the teachers understood that they could withdraw from the research at any time. However in order to drop out of the institutional project, they were requested to send a letter to UNA-Virtual explaining the reasons. That is, a teacher could decide not to be part of the study but still be participating in the community and in the designed activities. In that case, data relating to those participants was not collected. The participants had the right to anonymity; pseudonyms were used in quotations and in documentation of the findings.

Another important ethical consideration is that even though the proposed community-oriented professional development model was designed for research purposes, it was designed with a commitment to the needs of the university teachers and based on quality pedagogical principles. Our commitment was always the learning of the teachers and their experiences of learning within the community were the target for the research. Furthermore, the refinements in the implementation phase were always driven by the teachers' viewpoints and well-being, rather than by theoretical or research interests.

There were no apparent risks in participating in this study; rather the participants could obtain some benefits from their participation. Participating teachers were part of an educational intervention that provided them with new competences in the integration of technology for pedagogical purposes, with knowledge about POPP and with new experiences in online environments. In addition, the participants received feedback on preliminary research findings through different

means, reports that were shared with them through the learning platform, online discussions and reflections, and co-located meetings. The development of the project was always visible and open to suggestions from the participants.

4.8 Qualitative Criteria

Kvale states that, in social sciences, verification of knowledge is related with the concepts of reliability, validity and generalizability (Kvale, 1996). Likewise, the Design-Based Research Collective argues that finding ways to address objectivity, reliability and validity issues is necessary to ensure the scientific rigor of design-based research (Design-Based Research Collective, 2003)

Although all these concepts are related to the scientific quality of a research project, they are considered methodological challenges that design-based research, as an emerging methodology, needs to face in order to produce credible evidence (Barab & Squire, 2004; Bell, 2004; Brown, 1992; Collins et al., 2004; Dede, 2004; Design-Based Research Collective, 2003; Fishman et al., 2004; Gravemeijer & Cobb, 2006; Hoadley, 2004; Kelly, 2004; O'Donnell, 2004; Shavelson, Phillips, Towne, & Feuer, 2003). These challenges are connected to several issues such as reliability, validity, generalizability, replicability and sustainability.

Reliability

In qualitative research, reliability can "be regarded as a fit between what researchers record as data and what actually occurs in the natural setting that is being researched" (Cohen et al., 2003, p.119). However, this not means uniformity in the interpretation of findings; two researchers studying the same setting may generate different findings, and both of them might be reliable. In the context of interviews, Kvale (1996) suggests that in qualitative research there might be as many interpretations as researchers analyzing the data.

Silverman proposes an approach where high reliability is associated with low-inference descriptors, and this involves "recording observations in terms that are as concrete as possible, including verbatim accounts of what people say, for example, rather than researchers' reconstructions of the general sense of what a person said, which would allow the researchers' personal perspectives to influence the reporting" (Seale, 1999 cited in Silverman, 2001, p.283).

In the research under study, a large part of the data could be considered as low-inference. All the interaction on the online platform is textual, thus comprising the participants' own perspectives. The workshops carried out by the researcher and the two co-located meetings were recorded and then carefully transcribed according to the needs of the research. For the other workshops carried out by the facilitator of the community in each regional campus, I used the facilitator's summary of her interpretation of what took place, not verbatim transcripts.

The main issues under study in this project are supported with extracts of the data; and all the information is available for inspection of what took place through the project. During the project, I had made available for all the participants my preliminaries analysis and asked their opinion.

In order to improve reliability, design-based research recommends the use of triangulated data generation methods, repetition of analyses across cycles of enactment and use of standardized instruments (Design-Based Research Collective, 2003). In this study, I have used multiples sources of data in my interpretation of the events, such as participant observation, community transcripts and questionnaires. The aim to use multiple methods was twofold, to get an in-depth understanding of the phenomenon under study, and to add rigor, breadth and richness to the research (Denzin & Lincoln, 2003)

Validity

According to Kvale (1996), validity in qualitative research concerns the degree in which a method investigates what it is intended to investigate, and validation occurs throughout the process of research, "continually checking, questioning, and theoretically interpreting findings" (p.241) . Validity in qualitative research is related with descriptions and whether the interpretation of that description is credible or not. The Design-Based Research Collective (2003) states that the validity of findings in design-based research lies in the process of iteration and collaborative partnership that characterize the paradigm and this results in the alignment of theory, design, practice and measurement over time (Design-Based Research Collective, 2003; Hoadley, 2004).

Due to the iterative nature of the chosen approach for this research and the long-term collaboration with the facilitator and teachers, the validation of findings was a continuous process that served as an input to the refinement of the design. The preliminary findings were extensively discussed with the facilitator and were available for teachers in the form

of reports. Most of this discussion took place through digital media such as skype, messenger, e-mail, and BSCW (Be Smart – Cooperate Worldwide). Furthermore, some of the preliminary findings were communicated in two papers co-authored with the facilitator and the research observer.

However, this communication and negotiation process between the facilitator and the researcher was not always a straightforward process. How to map theory and practice is always a challenge, there are many variables that need to be considered, such as the institutional context, the facilitator's conceptions about professional development, the teachers' constraints, and the researcher's goals and theoretical principles. Nevertheless, these multiples perspectives contributed to an enrichment of the validation of findings.

Another central challenge associated with the validity of the data in design-based research arises due to the role of the researchers as designers and researchers (Barab & Squire, 2004; Hoadley, 2004). Design-based researchers are not simply observing interactions but are actually "causing" the very same interactions which they make claims about. "If a researcher is intimately involved in the conceptualization, design, development, implementation, and researching of a pedagogical approach, then ensuring that researchers can make credible and trustworthy assertions is a challenge" (Barab & Squire, 2004, p.10).

During ten months, I was immersed in the research context, as a designer, a researcher and a member of the community. My interaction with the facilitator was very close, and in addition, I was always carrying my identity and experiences as a university teacher, so being objective could be seen as a difficult task. My focus in this study is on the teachers' understanding of meanings in their experience within the community and during the innovation of their practice through POPP and ICT. I understand the knowledge that I have obtained as a co-construction in the interaction between all the members of the community and, in this sense, it captures multiple views, including mine. In order to reduce bias and subjectivity, I have used multiple sources of data to document and connect the findings to the context, to the design and to the participants.

Generalizability

According to Cobb et al. (2003), seeking generalizability supports the goal of design-based research in developing theories that go beyond the particulars of a given context. The issue here is that design-based research is a highly contextualized approach and relies heavily on thorough

description of data. Hence, the issue of generalization of findings has been widely discussed. One perspective advocates making little account of issues of generalizability in favor of gaining a richer understanding of the local situation. Another perspective transfers the generalizability to the reader, so researchers should make context-rich descriptions of the situation, the design decisions and the research outcome in order to enable the readers to grasp the meaning of the research and make inferences to other situations by themselves (McKenney, Nieveen, & van den Akker, 2006).

Kvale (1996) uses the term analytical generalization to refer to the process of using the findings from one study as a guide to what might occur in another situation. The generalization is based on the analysis of similarities and differences between the two contexts or situations. In this perspective, he poses a question regarding who should make this analytical generalization, the researcher or the reader. Regarding this issue, Gravemeijer and Cobb (2006) state that generalizability in design-based research can be achieved by framing local activities and events as exemplars or prototypes. They argue that "what is generalized is a way of interpreting and understanding specific cases that preserves their individual characteristics" (p.79).

To O'Donnel (2004), generalization in design-based research is a very difficult task due to the nature of the paradigm where an educational intervention is continuously adjusted to the context and participants; making it difficult "to know which combination of features of the intervention actually contribute to its success" (p.257). On the other hand, Hoadley (2004) argues that design-based researchers should share their findings from specific contexts making tentative generalizations but without the expectation of universality. Similarly, Barab and Squirre talk about petite generalization (Stake, 1995 cited in Barab & Squire, 2004) to refer to the process of understanding the dynamics of a particular context but showing the relevance of the findings to other contexts.

This study is bounded and situated in a specific context, with all their particularities. Even when I intend to indicate a broader applicability of research findings through the illustration of a particular phenomenon, it is ultimately the readers who should evaluate the usefulness of the study for other contexts. In line with the expected outcomes in design-based research, my results take the form of suggestions or guidelines for the design of community-oriented teacher professional development environments and these suggestions can be refined through further cycles of iterations towards generalizability of findings.

In order to reinforce the possibilities of generalizability, this thesis

offers rich descriptions of the studied context, the intentional design, the relation with theoretical principles and documentation of procedures for collecting and analyzing data in order to make it possible for the readers to judge the relevance of the findings to their particular contexts.

Replicability

Replicability is another central idea in scientific research. However, in design-based research, it becomes difficult to replicate others' findings. According to Hoadley (2002), the challenge of replicability should be faced through a thick description of the research.

> *Not only is the researcher obligated to fully describe the tools he or she may have built, but also relate as fully as possible the context in which the tools are being studied, the activities and practices offered to the users, and, most importantly, the evolution of the context over time in response to the tools (p.2).*

This involves documenting the intervention in a way that provides insight into the local dynamics of the phenomena, but preserving the global meaning. In this respect, Hoadley suggests design narratives as one way of making sense of design-based research. A design narrative is a structure for communicating a series of related events, describing the history and evolution of the design over time. "By relating the design's changes over time, a design narrative can help make explicit some of the implicit knowledge the designer or designer-researcher used to understand and implement the intervention" (2002, p.7). But, Shavelson et al. questions the frequent reliance on narratives used by design-based researchers to communicate the findings: "To what extent does the narrative generalize to other times and places? To what extent would another narrator replicate the account? How can it be determined that the narrative being used is complete, or does not misrepresent events?" (2003, p.27).

Gravemeijer and Cob (2006) address this issue of replicability as ecological validity. They argue that design-based research aims for ecological validity, meaning that the findings should provide a basis for adaptation to other situations. Hence, the goal is to develop a local theory that serves as reference framework for others who want to adapt the innovation in their personal contexts. They suggest a thick description as a useful element to document the design experiment. A thick description (Geertz, 1973) includes information about the context of an action, the intentions and meanings that drive the action and its subsequent evolution. A thick description must specify everything that the reader needs to know in order to understand the findings (Lincoln & Guba, 1985); it may allow the readers to verify for themselves the findings

and their transferability to other settings (Ritchie & Lewis, 2003).

But, what is the difference between a thick description and a narrative? According to Levine (1998), they are different concepts, a narrative is a series of events that take place over time; it entails action and tends to naturally include some description. A thick description presents solid descriptive elements, but may lack a temporal dimension. "Any thick description situates an event within a relatively broad context; and often the most useful kind of context is provided by a narrative" (p.32).

In this research, the issue of replicability is addressed through narratives. The intention to use narratives is to acknowledge the complexity of the community environment, rather to see it as a collection of elements and events. The narratives are written in a way that provides a thick description of the design, the context, important events, the participants, and how the interaction between all of them evolved over time, and also in many instances, providing the words of the participants to express the meanings of their experience. In this way, the emphasis is in reporting the research in a way that can be retraced by other researchers, and also enable them to evaluate the potential appropriateness for other settings, contributing to the ecological validity of the research.

Sustainability

In design-based research, researchers immerse in the context of the intervention, but what happens after the researchers have left the context? Are the participants able to make the innovation sustainable?

According to Fishman et al. (2004), one weakness of design-based research is that it does not usually address issues of sustainability, usability and scalability. He argues that if researchers are going to promote truly sustainable innovations, it is fundamental to consider the boundaries of context and system variables as ease of adoption, sustainability and spread (Collins et al., 2004) not only as outcome measures but as integral parts in designing the educational intervention.

The sustainability of the educational intervention was a goal of this research from the beginning. Even when is beyond the scope of the researcher to guarantee the sustainability, usability and scalability of the educational intervention proposed and studied here, a considerable amount of time was taken during the intervention period to discuss with participant teachers about a sustainable strategy for the community, and after the intervention, the research team (facilitator, observer, coordinator of UNA-Virtual and researcher) continue working in order

to propose an institutional sustainable development strategy for the community.

Summary

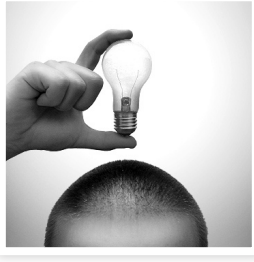
This thesis concerns the design, development, implementation and analysis of a purposeful educational intervention to support the professional development of UNA teachers in the introduction of technology and POPP in their teaching practices under the umbrella of the theory of communities of practice. In this chapter, the research paradigm, methodology and methods of data generation and data analysis were discussed.

The research strategy is informed by the design-based research methodology. Design-based research has in its core the creation of design principles that can transform educational practice. According to many learning science researchers, the methodology is very promissory as an alternative model for inquiry in the educational research field. However, there is a lack of methodological standards and processes; a lack of a common language and terminology that guide the researchers in how to conduct design-based research and in how to convince others of the credibility of their claims. These circumstances increase the complexity that design-based researchers have to face in their task of developing innovative learning environments grounded in theory, implementing the intervention in a real context, and reporting the findings showing both the local impact and the more global value.

In order to address the research questions of this study, I have been "inspired" by design-based research as an exploratory research approach that gives me the opportunity to construct knowledge together with practitioners, to learn about their problems and institutional issues that influences their learning process, and to adapt the initial design to these conditions. What I mean here by "inspired" is that I see myself as a qualitative researcher inspired in the intention and methods of design-based research rather than a design-based researcher.

Methodological criteria such as validity, reliability, generalizability and replicability have also been presented. The criteria of sustainability and scalability will be further discussed in chapter 10. In the next chapter, the design principles that inform the preliminary design of the educational intervention will be explained.

Chapter 5



Developing a Design Solution

One can design roles, but one cannot design the identities that will be constructed through these roles. One can design visions, but one cannot design the allegiance necessary to align energies behind those visions. One can produce affordances for the negotiation of meaning, but not meaning itself. One can design a curriculum but not learning.

(Wenger, 1998, p.229)

Developing a Design Solution

This study explores how a professional development program with a community focus can be designed to promote changes in university teachers' practice. This chapter corresponds to the second phase of the research strategy, Development of solutions with a theoretical framework, and its purpose is to explain the theoretical foundations of the proposed educational intervention. This theoretical foundation is grounded in the literature review and existing design principles (chapter 2) and in the analysis of the research context (chapter 3). The outcome of the chapter is the conceptual design of the intervention.

The chapter is divided into six sections. In the first one, I work through the guidelines for professional development presented in chapter two, and from their aggregation and synthesis, the first set of draft design principles are generated. In section 5.2, Wenger's learning architecture (1998) is presented and from its analysis and contextualization within a framework of professional development the second set of draft design principles emerge. Section 5.3 deals with project-oriented problem pedagogy and its outcome is a third set of principles. In section 5.4, the three sets of principles are integrated using Wenger's learning architecture as an overall framework. In section 5.5, two additional considerations about the context of the intervention are considered, and finally in section 5.6, the conceptual design is presented as a reification of the design principles analyzed throughout the chapter.

5.1 Designing from the Perspective of Effective Teacher Professional Development

In order to integrate the principles of effective teacher professional development in the design of the educational intervention, it is important for this study to determine whether core themes could be identified in the literature about professional development for academics. In chapter 2 (section 2.1), I have presented different views of effective professional development. While there are variations among these sets of principles, there are also common themes that emerged after a process of aggregating and synthesizing the concepts. I looked for commonalities and grouped these; some concepts were subsumed by others or rewritten to be more inclusive. From this process, six core themes were identified: learner-centered, transformative, meaningful, action-oriented, collegiality-collaborative, and ongoing and sustained. Table 5.1 shows these themes and the corresponding sources.

Theme	Description	Authors
Learner-centered	• Acknowledging the individuality of academics: their teaching and learning style, educational background, prior experiences, area of expertise, attitudes toward change and innovation adoption, work constraints and their professional development goals. • Making academics feel safe and respected. • Scaffolding academics based on their strengths.	(Gallant, 2000) (Lawler & King, 2000) (King, 2003) (Daley, 2003) (Wlodkowski, 2003)
Transformative	• Promoting reflective practice • Challenging assumptions, beliefs, and values • Supporting changes in thinking and behavior • Empowering academics to transform their perspectives • Empowering teachers to take responsibility for their own learning	(Lawler & King, 2000; Lawler & King, 2003), (Lloyd et al., 2005), (Laurillard, 2002), (Entwistle & Smith, 2002), (Smyth, 2003), (Trigwell et al., 1999), (Gibbs & Coffey, 2004), (Light & Calkins, 2008), (Kember & Kwan, 2000), (Cranton & King, 2003), (Layne et al., 2004), (Wlodkowski, 2003)
Meaningful	• Addressing academics' immediate and ongoing needs • Being relevant, practical and meaningful • Having a direct and sustained impact • Being delivered in a professional and appropriate way • Learning experiences connected to real-life needs of academics • Adding to personal knowledge • Increasing personal skills • Enhancing academics' status within the learning community • Providing skills and strategies for academics to envision themselves as lifelong learners	(Lawler & King, 2000) (Lloyd et al., 2005) (King, 2003) (Wlodkowski, 2003)
Action oriented	• Providing opportunities to implement what is learned. • Providing learning experiences to discover and apply educational technology • Emphasizing practical applications and connections to academics' work	(Gallant, 2000) (Lawler & King, 2000) (King, 2003)
Collegiality and collaborative	• Creating a safe place to make errors, experiment, complain, tell success stories, and think reflectively • Encouraging the sharing of stories, experiences, and collaboration with colleagues, expanding professional and personal networks. • Linking cooperative learning and practice	(Gallant, 2000) (Lloyd et al., 2005) (King, 2003) (Wlodkowski, 2003) (Sorcinelli et al., 2006) (Lock, 2006)
Ongoing and sustained	• Being timely, prolonged, ongoing and sustained • Designing and offering on an ongoing, incremental, and cumulative basis • Providing adequate time for participation, reflection and implementation. • Aligning with institutional policies and structures	(Gallant, 2000) (Lloyd et al., 2005) (Lawler & King, 2000) (Laurillard, 2002), (Sorcinelli et al., 2006)

Table 5.1 Emerging themes in effective professional development

The relevance of these themes for teacher professional development was discussed in chapter 5, through the presentation of the literature review and the different models and approaches of professional development. The themes suggest that professional development for academics should be identity transforming, focusing on reflective practice, and involving 1) recognition and respect of differences in teachers' background, prior experiences and area of expertise; 2) recognition and response to teachers' needs; 3) action-orientation in authentic settings; 4) collaboration and building of trust relationships; and 5) ongoing support for continuous and sustained learning. However, as was also presented in chapter 2, typical professional development programs are 1) one-time and one-size-fits for all events; 2) delivered using the transmission model from experts to teachers; 3) carried-out away from teachers' real settings; 4) focusing on individual learning; and 5) focusing on action without reflection.

To address this weakness, a community of practice framework was proposed. The literature review about communities of practice was presented in chapter 2, section 2.2, and in section 2.4. It was presented how a community approach, - in which academics engage in their own learning, collaborate and support each other, and have a supportive context for inquiry and reflection, - can successfully accomplish the general principles of effective professional development.

Table 5.2 summarizes examples of characteristics of communities of practice that contribute to the themes that emerged from the analysis of principles of professional development.

Theme	Description
Learner-centered	• Learning is acquired through engagement in practice and through experience (Wenger, 1998) • The richness of the learning process resides in having others who share your overall view of the domain and yet bring their individual perspectives (Wenger et al., 2002) • Knowledge is derived from the professionals' own experience as well from formal knowledge (Schön, 1987) • Learning is distributed and transformed among members of the community (Trentin, 2002) • Knowledge is integrated in the life of communities that share values, beliefs, languages, and ways of doing things (Wing Lai et al., 2006)
Transformative	• Being part of a community enables members to articulate their understandings about different problems, and to examine them from multiple perspectives (Barab et al., 2001). • Learning is conceptualized as a process of identity change within a social network (Brosnan & Burgess, 2003) • Empowerment – the ability to contribute to a community – creates the potential for learning (Wing Lai et al., 2006)

Theme	Description
	• Communities of practice can facilitate teacher reflection (Buysse et al., 2005; Riel & Polin, 2004) • Communities of practice help changing instructional practice and strategies (Gallucci, 2003; Moore & Barab, 2002; Riel & Becker, 2000) • Communities of practice can support change of beliefs and attitudes towards teaching (Wing Lai et al., 2006) • Communities of practice facilitate identity building (Barab & Duffy, 2000; Gray, 2004; Guldberg & Pilkington, 2006; Henri & Pudelko, 2003; Hung, Chee, Hedberg, & Seng, 2005; McLoughlin & Lee, 2008; Nett, 2008; Nichani & Hung, 2002; Preece, 2000; Riel & Polin, 2004; Wenger, 1998) • Communities of practices provide social spaces that allow teachers to realign their identities and practices (Henderson, 2007)
Meaningful	• Learning is grounded in the daily activities and is intrinsically linked to the context in which knowledge is applied (Wenger, 1998) • Learning in communities of practice is situated and authentic (Buysse et al., 2005; Davenport, 2001; Hildreth et al., 2000; Hung & Chen, 2001; Johnson, 2001; Lueg, 2000) • Communities of practice facilitate knowledge creation and sharing best practice (Glenn et al., 2000; Ramondt & Chapman, 2004)
Action oriented	• Knowledge is inseparable from practice (Lave & Wenger, 1991) • In communities of practice, you learn how to put knowledge into practice through engagement in practice within a community of practitioners (Schlager & Fusco, 2004)
Collegiality and collaborative	• Learning is a process of participation and a function of being a member of a community of learners (Barab & Duffy, 2000). • Communities of practice promotes a sustained social network of individuals who share and develop an overlapping knowledge base, and a set of beliefs and values (Barab et al., 2004) • Communities of practice reduce teacher isolation (Gray, 2004; Ramondt & Chapman, 2004) • Social interaction is a fundamental process of learning (Bransford, Brown, & Cocking, 1999; Brown & Campione, 1998; Lave & Wenger, 1991; Riel & Polin, 2004) • Learning through engaging with other members in mutual, accountable and negotiable ways (Henderson, 2007)
Ongoing and sustained	• There has to be time for a group to develop a shared repertoire (Cousin & Deepwell, 2005; Wenger, 1998)

Table 5.2 Professional development themes and communities of practice

The relevance of the community of practice framework for teacher professional development relies on its approach to learning as a social process. In other words, it is able to open to new ways of thinking and to possibilities of experimentation with new practices and consequently transform ourselves through engagement and critical reflection with colleagues. And this transformation not only concerns new knowledge and skills, but also a higher professional self-esteem and a sense of

professionalism.

From the above discussion, we can derive the first set of draft design principles:

First set of draft design principles

- Design for a learning environment in which perspectives, experiences and context of the academic participants are mutually acknowledged and respected.
- Design for reflective and challenging learning experiences to explore academics' perspectives and values, and to lead them to the construction of new understandings.
- Cultivate a positive attitude towards the learning experience through personal relevance and the connection to real and everyday needs of academics.
- Design for a learning environment that encourages active participation and in which academics competently apply their learning in their own teaching environments.
- Design for a learning environment in which academics feel connected to each other, and mutually construct new understandings, meanings, and solutions.
- Design for a sustained, ongoing, and supportive learning environment for academics.

5.2 Designing from the Perspective of Communities of Practice

It is the intention of this study to explore a new way of addressing the professional development of academics, with a shift of focus from formal training to learning in practice (Wing Lai et al., 2006). The main premise of the study is that learning is a participatory process that involves "doing, becoming, and belonging, not simply acquiring" (Ng & Hung, 2003, p.62). Similarly, Jarvis (2003) argues that learning is the process of transforming experiences into knowledge, skills, attitudes, values, beliefs and emotions. Given this conceptual framework, the intention of this section is to develop design guidelines for professional development explicitly based on a community approach to teachers' learning.

In this investigation, the design of a professional development environment for academics entails the provision of facilities to enable and support the belonging of teachers to a community of practice. If

we take as a premise that learning is a process of participation in a community of practice, thus becoming member of an emerging teaching with POPP+ICT community of practice is both a process of identity construction, and a process of competence acquisition, and it involves, in the first instance, 'peripheral participation' in that community of practice. In this perspective, the educational design is a resource in the teachers' learning community, and "communities of practice become resources for organizing learning as well as context in which to manifest our learning through an identity of participation" (Wenger, 1998, p.271).

In this section, I turn to the analysis of the ways in which we can design a professional learning environment for university teachers that can provide an opportunity for the community to grow. In general, the literature suggests that we cannot create a community of practice for professional development goals. However, Wenger (1998) argues that while you cannot design the learning you can design for learning. Wenger's conceptual architecture for learning (my conceptualization in figure 5.1) provides a framework in which we can design a social

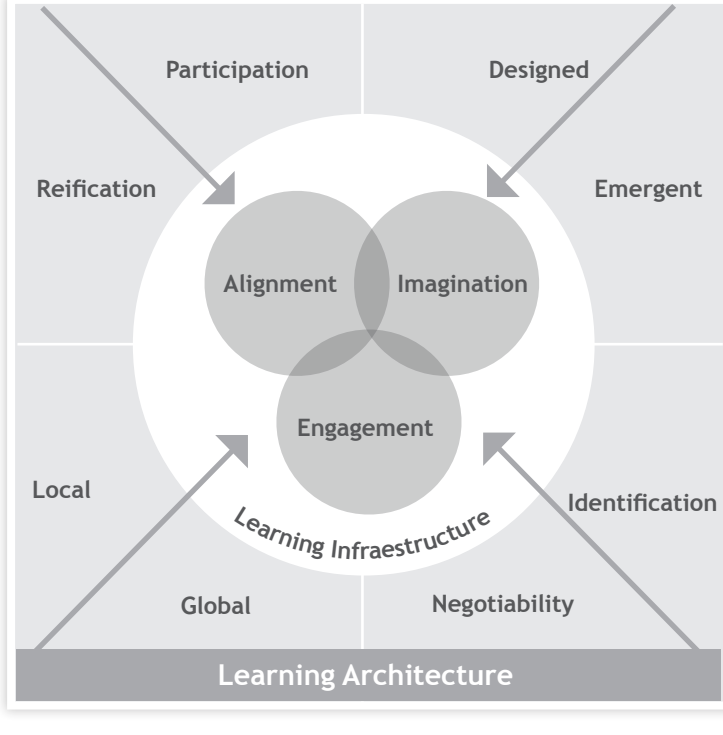


Figure 5.1 A conceptualization of Wenger's learning architecture

learning space that affords the evolution of a community of practice. This framework is expressed in terms of four basic dimensions of the design space and the basic components and facilities for learning that the design should provide. The framework does not intend to be prescriptive but rather to outline the elements that need to be considered for providing a productive environment in which a community can grow.

The four dimensions of the design entail issues of meaning, time, space and power (Wenger, 1998). Wenger captures these aspects with four dualities: reification and participation; designed and emergent; local and global; and identification and negotiability. The components of the learning architecture are expressed in terms of the modes of belonging: engagement, imagination and alignment.

Even though the theory of communities of practice is becoming broadly used in educational contexts, only few empirical works address and discuss the learning architecture as a whole. Some authors such as Baek & Barab (2005) and Barab, Barnett, & Squire (2002) discussed the importance of understanding a community in terms of the interplay of system dualities. Others works, for example those of Barab et al. (2004), Eberhagen (2003), Henderson (2007), Ollila & Simpson (2004), Putz & Arnold (2001), and Sorensen & Murchú (2003, 2004) introduced the four dimensions as analytical tools to understand and address the design for learning. In general, the modes of belonging are less addressed in the literature. Authors such as Au (2002), Cousin & Deepwell (2005), Gallucci (2003), Hartnell-Young (2004), Meyers, Nathan, & Saxton (2008) and Solomon (2007) explore them as a means to organize learning. Only two studies of the reviewed analyzed both components of Wenger's learning architecture, namely Brosnan & Burgess (2003) and Maheux & Bednarz (2008).

In the next section, the four dualities are explicates, and section 5.2.2 will present the modes of belonging. The presentation of these conceptual components has as an objective to identify design principles that would support the processes of designing for, as well as fostering and sustaining the learning community of university teachers. This chapter does not intend to go deeper into the conceptual explanation of the components.

5.2.1 Understanding the dualities

"Duality is a single conceptual unit that is formed by two inseparable and mutually constitutive elements whose inherent tension and complementarity give the concept richness and dynamism" (Wenger, 1998, p.66). In terms of the educational design, the dualities

are analytical tools that can give a better understanding of the process of design for a community. The challenge is then to recognize the tensions, how they impact on community life, and to balance their influence in the support of learning (Barab et al., 2004). In the following paragraphs, I briefly describe each of the four dualities; however it is important to keep in mind that they are not considered as separated entities; rather they clearly overlap each other.

Reification/participation

Participation and reification are both dimensions of practice and identity, and as such they influence the future: the direction of practice or the trajectory of a person (Wenger, 1998). This duality creates two kinds of affordances for negotiating meaning as it concerns the need of creating a balance between resources for learning (reification) and the activities that make use of those resources (participation). In order to negotiate meaning, some artifacts should be in place (tools, plans, procedures, schedules, curricula), and the right people must be brought together in the right kind of relation to make something productive happen (Wenger, 1998).

This design duality emphasizes meaningful activity that is structured around appropriate resources (Brosnan & Burgess, 2003). In the context of this study, this dimension means bringing together a group of university teachers through online and physical spaces, and providing them with a balance between opportunities of participation and resources they will use in support of this participation. The negotiation of meaning evolves around core concepts, such as the introduction of technology in teaching practices, and student-centered pedagogical approaches - project-oriented problem pedagogy (POPP). In terms of the design, it is important to be aware that this negotiation of meanings could create a tension between the teachers' previous experiences, values and beliefs about teaching and learning processes and the new concepts and approaches that are discussed within the community. Another tension can also be provoked by tools, plans, procedures, schedules and the online learning environment as reification. They could be too rigid or too loose for different teachers and as such it will become difficult to negotiate and agree on those reifications.

Designed/emergent

With respect to this duality, Wenger (1998) emphasizes that "there is an inherent uncertainty between design and its realization in practice, since practice is not the result of design but rather a response to it" (p.233). In the same line of thought, Goodyear et al. (2001)

advocates for more indirect forms of design. They suggest that we can design for organizational forms, learning tasks, and learning spaces but it is participants who transform them into communities, activities, and places.

Within this study, a conscious effort is being put into the design of tasks, spaces and organization that enables university teachers to engage in dialogues, discussions, project work and negotiations (Goodyear et al., 2001). Furthermore, in order to acknowledge this duality, the design and facilitation of the learning environment need to be flexible enough to allow emergent participant structures, academics' learning agendas and participation norms. According to Brosnan and Burgess (2003), this duality involves allowing teachers to negotiate how they transform the design in ways that are meaningful to them; thus the ultimate goal of the design will be to create a space for continued negotiability among all the members of the community.

The aim of this project is fostering changes in university teachers' identities, practices and trajectories. As such, we need to acknowledge that a meaningful change in their teaching practices may create a tension between their own model of teaching and the new models valued and promoted by the institution (stated in UNA new pedagogical model and new policies about the use of educational technology). This potential tension between both practices needs to be acknowledged in the design.

Local/global

This duality refers to how a community of practice relates with the rest of the world, through creating continuities across boundaries. This cross of boundaries can be achieved through (1) the use of boundary objects, such as artifacts, documents and concepts; (2) use of multi-membership –brokering- to make connections across communities, enable coordination, and open new possibilities for meaning; and (3) boundary encounters, such as meetings, conversations and visits (Wenger, 1998). The local/global dimension represents the fact that any community of practice should be able to link its local practices to more global frameworks and have an influence upon them (Brosnan & Burgess, 2003).

The challenge in designing for a community with a focus on change is to create a balance between meeting the teachers' particular and immediate needs and a more global institutional change agenda (Barab et al., 2004). The core concepts and practices that must be negotiated throughout the educational intervention need to have local significance

to each teacher (and each regional campus) but at the same time be of global relevance to all teachers in the community and to the university community in general. On the other hand, given the geographical distribution of the participants in this study, we recognize the richness in having teachers from five different regional campuses and we see an opportunity of expanding knowledge to the local communities through the negotiation of meaning about particular boundary objects.

Concerning this duality, we acknowledge a potential tension between academics' current expertise and what is expected from them as professionals in an institution of higher education under the demands of the knowledge society. However, the design of the learning environment (and the emergent community) may serve itself as a boundary object around which participating teachers can negotiate their contribution to the institutional educational practices and their alignment to the new institutional efforts and policies.

Identification and negotiability

The three dimensions presented above are all related to issues of balancing both sides of the duality, but the identification/negotiability duality has a different character because one (identification) is a necessary condition for the other (negotiability). It refers to the degree to which members identify with the community and the extent to which they are empowered to shape the community, and as such it has an effect on the formation of the identity through the mix of participation and non-participation (Wenger, 1998).

For the goals of professional development programs this duality is very important. Teachers are invited to new practices, thus they will be able to decide whether to identify or not with the community practices and consequently whether to participate or not in it. In this perspective, it turns fundamental as a first step to ensure that the design of the learning environment is simple enough to allow all teachers to not only participate in the community life, but to take part in the process of defining, adapting and interpreting the design (Wenger, 1998).

In relation to this duality and from the point of view of identity formation, we detect a potential tension in the teachers' process of adapting to the community and moving from the periphery to the core, because it would require a transformation to a new professional identity, based on their new competences and relationships.

5.2.2 Understanding the modes of belonging

The aim of this study is designing an environment for learning within which a learning community can form and evolve, offering opportunities to the participating university teachers to explore new ways of knowing and to develop their identity as professionals. The design of the learning environment in terms of Wenger's learning architecture needs to provide university teachers with varied opportunities for multiple modes of belonging. Thus according to Wenger, the challenge of design is "to support the work of engagement, imagination and alignment" (1998, p.237).

In this respect, using Wenger's learning architecture to design a learning environment for academics entails offering them places of engagement; experiences and resources to build an image of themselves and the world; and possibilities of having an effect on the world (1998). Hence, engagement, imagination, and alignment are modes of belonging by which university teachers can take part in the practice of the community, learn about the practice, and shape their identities. These modes of belonging, like the design dimensions discussed previously, are interrelated but each one represents different forms of participation and identification within the community. Combining and balancing them will contribute to the creation of a rich context for learning. However, it does not mean that each mode has to or can be present in the same degree, in fact usually one of them dominates over the others, and it is this balance and interaction which define and characterize a learning community. In the following, each mode of belonging is described. Again, the purpose of discussing these modes of belonging is to identify principles that support the design of the educational intervention. Indeed, the modes of belonging help to operationalize the design considerations emerging from the four dimensions.

Engagement

Engagement entails an active involvement in mutual relationships in the negotiation of meaning. "As a context for learning, engagement is not just a matter of activity, but of community building, inventiveness, social energy, and emergent knowledgeability (Wenger, 1998, p.237). Thus, engagement stresses the formation of the community and relies on the definition of a common enterprise and on meaningful and shared activities in which interpersonal relationships can be developed among members of the community.

In designing for a community, engaging is a vital component because it is the starting point for achieving any enterprise. Through engagement in the learning community, university teachers can create a

space within which to transform their identity. Moreover, engagement enables them to define activities to pursue, negotiate their meaning and to sustain them over time.

According to Wenger (1998), learning by engagement requires access to participation and reification. In this perspective, the university teachers will need to have access to other colleagues, and feel competent to contribute to the joint enterprise and to the development of the practice. Another essential component of engagement is the building of social relationships, thus in order to take risks, to expose themselves and to explore new approaches to teaching practice, university teachers will require a supportive environment founded on trust.

One of the goals of the present project is to provide university teachers with transformative experiences through the process of being part of a community of practice. Hence, in order to engage the teachers in the mutual process of learning, table 5.3 shows a list of engagement

Facilities of engagement – The learning environment should:
• Facilitate a space to interact (physical and/or virtual)
• Define and contextualize the core concepts to be introduced in a way that connects with teachers' interest and needs
• Provide opportunities for group work
• Offer situations in which teachers take actively part in the generation of knowledge and can develop a sense of ownership in that production of knowledge
• Provide opportunities to explore, discuss, exercise judgments, negotiate, mutually evaluate and validate understandings
• Be flexible to accept different degrees of commitment in the undertaking of the tasks
• Support a climate of trust and be supportive, teachers should have opportunities and feel comfortable getting and giving help.
• Provide occasions for applying skills, conceiving solutions, and making decisions
• Support a free circulation of information
• Provide problems that engage energy, creativity and inventiveness
• Provide resources and artifacts that support competence
• Promote generational encounters, apprenticeship systems and storytelling
• Sustain motivation
• Promote exchanges with experts
• Discuss current and relevant educational events at national and international level
• Provide teachers with opportunities to enhance their status within the learning community (salary, academic career, university reward systems)
• Open institutional spaces for teachers to influence institutional decisions and policies

Table 5.3 Facilities of engagement

facilities inspired by (Brosnan & Burgess, 2003; Cousin & Deepwell, 2005; Gallucci, 2003; Henderson, 2007; Maheux & Bednarz, 2008; Meyers et al., 2008; Wenger, 1998, 2000) but contextualized to a learning environment for university teachers.

Imagination

According to Wenger (2000), imagination concerns "constructing an image of ourselves, of our communities, and of the world, in order to orient ourselves, to reflect on our situation, and to explore possibilities" (p.227-228).

Many of the academics in this study are motivated to participate in the project by a process of imagination. They imagine themselves as a new kind of teacher, with a new set of competences and knowledge and with a new trajectory within the institutional context. In that sense, imagination is strongly linked with identity and with the university teachers' disposition for learning.

A learning environment for university teachers should provide them with opportunities to reflect, to explore different educational scenarios and new ways of teaching. The university teachers should gain opportunities to question themselves about who they are and who they could be, as well as where they come from and where they would like to go (Wenger, 1998). This reflection process holds the potential to shape their identites and to create new trajectories for them.

In order to support learning by imagination, the table 5.4 shows a list of facilities that should be taken in account when designing for learning communities. Again, the list is inspired on (Brosnan & Burgess, 2003; Cousin & Deepwell, 2005; Gallucci, 2003; Henderson, 2007; Maheux & Bednarz, 2008; Meyers et al., 2008; Wenger, 1998, 2000) but contextualized to a learning environment for university teachers.

Facilities of imagination- The learning environment should:
• Enable teachers to adopt other perspectives outside of their own teaching practice
• Involve orientation to images of what could be
• Provide opportunities for critical reflection
• Offer activities to explore and try new things
• Envision possible futures and possible trajectories; creating alternative scenarios (teachers of the 21st millennium)
• Envision links between teachers' classroom practices and broader educational practices
• Offer open-ended situations to give the teachers opportunities to explore and to be inventive

Facilities of imagination- The learning environment should:
• Offer situations which go beyond habitual activities and daily routines
• Encourage teachers to create their own teaching strategies using their previous and new knowledge
• Introduce and discuss different pedagogical approaches to address teaching and learning processes
• Encourage a transformation of teaching practice
• Encourage a more professional approach to teaching (reflection, inquiry, evaluation, documentation and communication)
• Encourage teachers to see themselves as leaders of the transformation of teaching practices

Table 5.4 Facilities of imagination

Alignment

Alignment is the coordination of energy and activities to contribute to a broader enterprise. Through alignment with more global processes, we make sure that our local activities are effective beyond our own engagement. The concept of alignment entails a mutual process of coordinating perspectives, interpretations and actions in order to achieve higher goals (Wenger, 2000). By coordinating enterprises on a large scale, alignment bridges time and space, so that the participants can connect to one another, and with other communities.

In the last years, UNA has defined new policies concerning teaching practices. However, these policies are not something imposed by the authorities but something that can be negotiated in order to find and establish a common ground. Through alignment, the participating teachers may become part of a bigger institutional educational community, contributing with their engagement to a transformation of the institutional educational practice.

For UNA teachers and particularly for those working at the regional campuses, participating in initiatives aligned with institutional goals will be a matter of being self-conscious about the educational practices at the university and at the same time of ensuring that their learning has an effect in a broader constellation. As a result, their feelings of belonging and contribution to the institution might be reinforced.

In this respect, the educational design should consider a set of facilities in order to recognize the need for teachers to make connections between the practice of the emergent learning community and broader issues outside this community. Table 5.5 shows a list inspired by (Brosnan & Burgess, 2003; Cousin & Deepwell, 2005; Gallucci, 2003;

Henderson, 2007; Maheux & Bednarz, 2008; Meyers et al., 2008; Wenger, 1998, 2000) but contextualized to a learning environment for university teachers.

Facilities of alignment– The learning environment should:
• Provide opportunities to do something in concert with others
• Make shifts or changes in practices based on new knowledge
• Converge around a common vision
• Coordinate practices with new standards or methods
• Enforce new institutional policies or procedures
• Provide opportunities for critical reflection and action about institutional policies
• Provide opportunities to understand the reasons underlying institutional policies
• Coordinate actions to be able to contribute to broader enterprises
• Allow adoption of shared visions and ways of doing
• Make sense in adopting standardized ways of doing things
• Be in touch with a broader context – national and international
• Support critical thinking about solutions and interpretations, especially by favoring different perspectives
• Validate with teachers the concordance between their understanding of teaching-learning concepts and their classroom approaches
• Have an influence on curriculum organization and development of institutional processes
• Promote the creation of institutional conditions that foster and reward the professional approach to teaching and the academics' role as reflective practitioners

Table 5.5 Facilities of alignment

From the above discussion about the learning architecture, we can derive the second set of draft design principles:

Second set of draft design principles

- Design for a learning environment that enables the negotiation of meaning through an adequate balance between activities and resources for learning.
- Design for a learning environment that fosters building of social relationships and trust among academics.
- Design for a learning environment that allows academics to negotiate how they translate the design in ways that are meaningful to them and their disciplines.

Second set of draft design principles

- Design for a learning environment that brings reflective and challenging learning experiences leading to a transformation of academics' identity and practice.
- Design for a learning environment that provides academics with different ways of identifying themselves as members of the community.
- Design for a learning environment that brings academics opportunities to negotiate, feel ownership, give meaning to and shape the practice of the community.
- Design for a learning environment that enables academics to envision possible futures and possible trajectories.
- Design for a learning environment that provides possibilities of connecting their local practices with the institutional and global practices.
- Design for a learning environment that provides possibilities of having an influence upon institutional and global practices.

5.3 Designing from the Perspective of POPP

In chapter 2 section 2.1.4, the learning principles supporting POPP were presented. For clarity, this section rephrases in terms of what they represent within a professional development framework for university teachers.

- Problem formulation and enquiry of exemplary problems: The problem is a stimulus for learning. Teachers should have opportunities to understand, discuss, solve and reflect on problems relevant to their practices, their professions, their research, their curriculum and passion.
- Participant control: Teachers should define and formulate the problems to pursue. This process acknowledges teachers' prior experiences, values, beliefs and expertise.
- Interdisciplinary learning: The learning approach should be built on the interdisciplinary expertise of teachers; and problems and issues to discuss should be extended beyond locally bounded practices.
- Joint projects and action learning: The group work is a stimulus for interaction; teachers' learning should take place through joint dialogue, communication

and collaboration in groups. The project work should integrate experiences from the teachers' practice with new knowledge and competences.

- Mutual responsibility: The learning process is a mutual responsibility among all the participants. Teachers should have a mutual responsibility for individual and collaborative learning.

Furthermore, section 2.3 argued that the above pedagogical principles can contribute to the formation of a community of practice. POPP may foster growth of a community because it creates interdependencies among participants; it is adaptable to the engagements of the participants; it supports the individual's construction of meaning through the construction of shared understanding; and it supports the development and change of professional identity through negotiations, confrontations and engagement in long-term relationships (Dirckinck-Holmfeld et al., 2009). This dynamic allows university teachers to integrate their professional practices with their professional development.

The pedagogical principles of POPP are very much aligned with the constituents of communities of practice: community (mutual engagement), domain (joint enterprise) and practice (shared repertoire), and as such, it may serve as an organizing, pedagogical model for continuous professional development (Dirckinck-Holmfeld, 2002) within the framework of a community of practice.

From the above discussion, we can derive the third set of draft design principles:

Third set of draft design principles

- Design for a learning environment that stimulates and motivates learning through the formulation, analysis and solutions of problems relevant to the practice, profession, research, and passion of the academics.
- Design for a collaborative learning environment that stimulates interaction through group work and joint projects that create interdependencies among academics.
- Design for a learning environment that builds on the expertise of interdisciplinary academics and allows an understanding of perspectives beyond locally bounded practices.
- Design for a learning environment that fosters a sense of mutual responsibility for individual and group learning.

5.4 Integrating the Principles

The aim of this section is to generate a set of integrated principles that can guide the design of the intervention. From section 5.1 to 5.3, we have generated three sets of conceptual principles that are presented in table 5.6.

Communities of practice	Professional development	POPP
• Negotiation of meaning through an adequate balance between activities and resources for learning. • Building of social relationships and trust among academics. • Negotiation of how they translate the design in ways that are meaningful to them and their practices. • Reflective and challenging learning experiences leading to a transformation of their identity and practice. • Ways of identifying themselves as members of the community. • Opportunities to negotiate, feel ownership, give meaning to, and shape the practice of the community. • Envisioning of possible futures and possible trajectories. • Connection of their local practices with the institutional and global practices. • Having an influence upon institutional and global practices	• Academics' perspectives, experiences and context are acknowledged and respected by each other. • Reflective and challenging learning experiences to explore perspectives and values, and to lead to the construction of new understandings. • Positive attitude towards the learning experience through personal relevance and the connection to real and everyday needs of academics. • Active participation in which academics competently apply their learning in their own teaching environments. • Connected to each other, and mutually constructing new understandings, meanings, and solutions. • Sustained, ongoing, and supportive learning environment for academics	• Learning through the formulation, analysis and solutions of problems relevant to the academics' practice, profession, research, and passion. • Group work and joint projects that create interdependencies among academics. • Building on the interdisciplinary academics' expertise and allow an understanding of perspectives beyond locally bounded practices. • Sense of mutual responsibility for individual and group learning

Table 5.6 Three sets of draft principles

Even when the three sets of principles are highly interconnected, they also complement each other, so after eliminating redundancies, the following list contains the final preliminary list of conceptual design principles to guide the design of the educational intervention in which we aim to open up a new practice for university teachers.

Design for a learning environment that

(1) *enables the negotiation of meaning and the mutual construction of new understandings and solutions through an adequate balance between activities and resources for learning*

(2) *fosters building of social relationships and trust among academics*

(3) *brings reflective and challenging learning experiences leading to a transformation of identity and practice*

(4) *provides academics with different ways of identifying themselves as members of the community*

(5) *brings academics opportunities to negotiate, feel ownership, give meaning to and shape the practice of the community*

(6) *enables academics to envision possible futures and possible trajectories*

(7) *brings possibilities of connecting local practices with the institutional and global practices*

(8) *encourages active participation in which academics competently apply their learning in their own teaching environments*

(9) *stimulates and motivates learning through the formulation, analysis and solutions of problems relevant to the academics' practice, profession, research, and passion*

(10) *stimulates interaction and a sense of mutual responsibility for individual and group learning through group work and joint projects that create interdependencies among academics*

Design for a learning environment in which

(11) *perspectives, experiences and context of the academics are acknowledged and mutually respected*

(12) academics receive a sustained and ongoing support for learning

(13) academics develop a positive attitude towards the learning experience through personal relevance and the connection to real and everyday needs

The previous conceptual design principles can be achieved by providing a set of facilities in the learning environment. To guide this process, table 5.7 comprises a set of facilities or guidelines identified in the three theoretical areas reviewed in this chapter (teacher professional development, communities of practice and project-oriented problem pedagogy). Table 5.7 classifies the design guidelines within the four dualities, also showing how they are contributing to engagement, imagination and alignment. This list does not pretend to be exhaustive; rather the intention is to provide a set of more specific guidelines responding to the above design principles. The reasons for choosing Wenger's learning architecture as the overall framework to make this integration is: (1) The social theory of learning brings the fundamental theoretical basis for this research; and (2) Even when the three components are closely interrelated, the social theory of learning is broader than the concepts of teacher professional development and POPP, thus in some way, it subsumes many of their concepts.

Dimension	Mode of belonging	Facilities
Participation/ reification	Engagement	Facilitate a space to interact (physical and/or virtual)
		Provide opportunities for group work
		Provide occasions for applying skills, conceive solutions, and making decisions
		Support a free circulation of information
		Support the formulation and solutions of problems that engage energy, creativity and inventiveness
		Provide resources and artifacts that support competence
		Provide learning experiences to discover and apply educational technology
	Imagination	Offer activities to explore and try new things
		Provide problems in which resolution will give a feeling of competence in the educational setting
	Alignment	Provide opportunities to do something in concert with institutional initiatives

Dimension	Mode of belonging	Facilities
Designed/ emergent	Engagement	Define and contextualize the core concepts to be introduced in a way that connect with the teachers' interest and needs
		Introduce and discuss different pedagogical approaches to address teaching and learning processes
		Offer situations in which teachers actively take part in the generation of knowledge and can develop a sense of ownership in that production of knowledge
		Promote collaboration, communication and dialogue as a means to develop understanding
		Foster among teachers a sense of mutual responsibility about learning
		Allow the emergence of new participant structures and learning agendas
		Provide adequate time for participation, reflection and implementation
		Encourage sharing of stories, experiences, and collaboration with colleagues, expanding professional and personal networks
		Be timely, prolonged, ongoing and sustained
		Provide scaffolding to teachers based on their strengths
	Imagination	Offer open-ended situations to give teachers opportunities to explore and to be inventive
		Encourage teachers to create their own teaching strategies using their previous and new knowledge
		Encourage a more professional approach to teaching (reflection, inquiry, evaluation, documentation and communication)
	Alignment	Validate with teachers the concordance between their understanding of teaching-learning concepts and their classroom approaches
		Formulate, implement and evaluate educational projects aligned with institutional new policies
Local/ global	Engagement	Promote exchanges with experts
		Encourage teachers to communicate their experiences with broader audiences (conferences, seminars)
		Invite experts from other practices
		Open institutional spaces for teachers to influence institutional decisions and policies
		Provide teachers with opportunities to enhance their status within the learning community

Dimension	Mode of belonging	Facilities
	Imagination	Enable teachers to adopt other perspectives outside of their own teaching practice
		Envision links between teachers' classroom practices and broader educational practices
	Alignment	Make shifts or changes in practices based on new knowledge
		Converge around a common vision
		Coordinate practices with new standards or methods
		Enforce new institutional policies or procedures
		Be in touch with a broader context –regional, national and international
		Remain tied to university reward systems
		Have an influence in curriculum organization and development of institutional processes
Identification/ negotiability	Engagement	Acknowledge teachers' individuality
		Promote a climate of trust
		Encourage teachers to take risks
		Provide a safe place to make errors and experiment
		Sustain motivation
		Be flexible
		Promote generational encounters
		Promote inter-regional campus encounters
	Imagination	Provide opportunities for critical reflection
		Provide opportunities to envision possible futures trajectories
		Encourage teachers to see themselves as leaders of the transformation of teaching practices
	Alignment	Provide opportunities for critical reflection and action about institutional policies
		Provide opportunities to understand the reasons underlying institutional policies
		Support critical thinking over solutions and interpretations, especially by favoring different perspectives

Table 5.7 Articulating dimensions, modes of belonging and facilities

5.5 Integrating the Context

Before to consolidate the design guidelines in a learning scenario, it is necessary to bring again the context in which the professional development takes place. In chapter three, the background context for the project such as institutional policies and previous experiences was explicated and, in section 3.7, some basic information about the participants of the study was presented.

The participants in this project are highly geographically distributed. The 27 university teachers participating in the project come from five geographically distributed campuses as it can be seen in figure 3.2. The researcher team work is also distributed, the facilitator of the community is a member of UNA-Virtual and she is located in the Central Campus in Heredia, and the researcher is established in Aalborg, Denmark. This geographical distribution has implications in the communication and design process. The communication and interaction between the team members are mostly via the Internet; we had used BSCW (Be Smart – Cooperate Worldwide) as a cooperation platform and document repository; Google docs to create collaborative documents; and e-mail, skype and messenger to communicate almost daily in the period from September 2007 to December 2008. Given the chosen methodology, the communication, coordination and collaboration were key elements for the development of the project because design-based research assumes continuous refinement (Collins et al., 2004). So whenever some elements of the design were not working properly, it was necessary to modify the design.

Before proceeding with the reification of the design, it is important at this point to consider two aspects regarding the participant teachers, (1) only 30% of them have a permanent position in UNA, and (2) only 30% have previous experience with online or blended learning environments. Both aspects have direct impact on the design. Even though some academics have been working for UNA for many years, they are hired by temporal contracts, and this fact creates uncertainty in them. Furthermore academics with temporal positions usually teach more courses per semester and this situation tends to increase the constraints about time and their perception about institutional incentives. Consequently this condition might affect the engagement of teachers with the learning process. The second aspect suggests that participants will need basic training in how to gain access to the online learning environment and in how to use the synchronous and asynchronous communication facilities. This is fundamental in order to allow teachers to identify with the community and to create trajectories from peripheral participation to engagement with new practices of POPP-based teaching with technology.

5.6 The Conceptual Design: a Reification of the Design Principles

In this section, the conceptual design of the intervention is presented as a reification of the design principles analyzed throughout the chapter. The figure 5.2 illustrates the conceptual design.

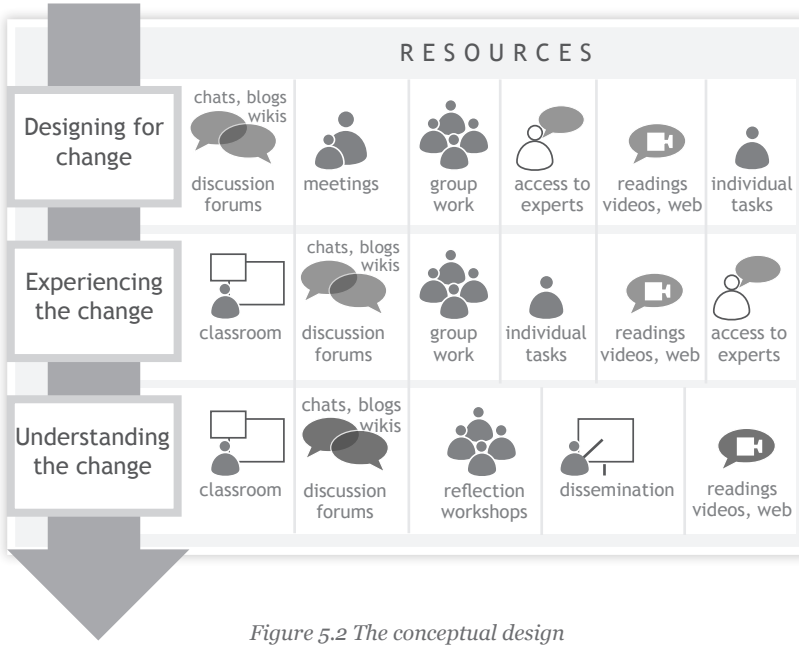


Figure 5.2 The conceptual design

The conceptual design of the intervention is driven by the main premise of being transformative (Gibbs & Coffey, 2004; Laurillard, 2002; Lawler & King, 2003; Light & Calkins, 2008), thus it aims to offer teachers an opportunity to transform their identity, trajectory and practice, and as such it is understood in three phases (Coto & Dirckinck-Holmfeld, 2008): Designing for change, Experiencing the change and Understanding the change. Each phase has a particular goal and uses specific design, facilitation, support strategies and resources. Figure 5.2 also shows these resources, and the relative importance of each resource within each phase is shown in the order that the resource appears (from left to right). The resource of the facilitator and the strategy of community cultivation is an overall feature, which is always present within the design. In the following, each phase is explained.

vThe objective in this phase is to offer the university teachers opportunities to participate in a number of collaborative activities that help them to get to know each other, to develop trust, to improve their pedagogical and technical knowledge and to collaboratively design an educational intervention in their classrooms. These activities are the first steps to promoting the formation of the community of practice (Barab, Kling, & Gray, 2004).

During this phase, the online interaction is a fundamental means to get to know each other and to learn and discuss new topics. Table 5.8 summarizes the online activities designed for the period from February to June 2008.

Activity	Resources	Description	Date
Welcome	Personal blog	Who am I? (background interests, experience, hobbies)	March
Reflection: learning expectations	Discussion forum	What are my expectations in this process?	March
Informal conversation	Chats	Informal conversations, various topics, clarifying doubts	Every Friday
Knowing each other	Game	How much I know about my colleagues?	March
Collective discussion: POPP	Readings, Discussion, forum	Reflections about the workshop	March
Reflection: transforming practice	Personal blog	Why do I want to innovate my teaching practice?	March
Group work	The working space of each group, Guidelines	Defining roles, name of the group, logo, internal organization, working strategy	April
Reflection: forming groups	Personal blog	How was the group formation process?	April
Collective discussion: Social and educational importance of ICT	Readings, Discussion forum, Guest Expert, Web	The potential of ICT in the educational process; from theory to practice; UNA context	April
Group work	The working space of each group Guidelines	Identifying a significant educational problem	April
Collective discussion: Problem and project based learning	Readings, Discussion forum, Guest Expert	Advantages and limitations. Institutional infrastructure. How to implement in a UNA-context?	May

Activity	Resources	Description	Date
Collective discussion: UNA pedagogical model	Readings, Discussion forum, Guest Expert	Pedagogical approach, new roles for teacher and student. How to implement this in a UNA-context?	May
Group work	Each group working space, Guidelines	Different perspectives to solve the identified educational problem	June
Individual task: social software	Blogger, Guidelines	Creating my first blog	June
Collective work: social software	Wikis, Guidelines	Creating a wiki	June
Reflection: social software	Personal blog, Video	How can I integrate the web 2.0 in my courses?	June
Collective discussion: Social software in higher education	Readings, Discussion forum	How to enhance the learning process using social software?	June

Table 5.8 Designing for change phase: online activities

As a complement to the online activities, three co-located meetings are programmed in this phase, two of them to be held in each regional center, Chorotega, Brunca and Puntarenas and the last one in the central campus in Heredia. Table 5.9 summarizes these activities.

Meeting/Workshop	Purpose	Date
- Chorotega (Nicoya and Liberia teachers) - Puntarenas (Marine Biology teachers) - Brunca (Pérez Zeledón and Coto teachers)	- Explain the learning goals, rules of participation, expected commitment. - Basic training in Moodle and UNA virtual classroom	February
- Chorotega (Nicoya and Liberia teachers) - Puntarenas (Marine Biology teachers) - Brunca (Pérez Zeledón and Coto teachers)	- Workshop with an international expert about POPP (project-oriented problem pedagogy)	March
Heredia central campus (all participant teachers)	- Social meeting - Dialogue with UNA authorities - Further training in using UNA virtual classroom - Reflection about the learning process - Preliminary evaluation of the design	June

Table 5.9 Designing for change phase: co-located activities

Both, the online activities and the co-located meetings/workshops are facilitated by the community facilitator (a member of UNA Virtual). Her role is to guide discussions, to encourage full, thoughtful involvement of all participants, to provide feedback, and to help intensifying the learning experience for teachers by encouraging productive interaction and critical reflection in daily teaching practices (Gray, 2004).

The role of the guest experts, both national and international, in the different activities is to exchange ideas, experiences, pedagogical strategies and new ways of approaching educational problems with the teachers. The role of both, experts and the supporting material (readings, links, video) is to open up to new perspectives, challenges and opportunities to university teachers, and in this way to contribute to the process of imagining new learning and teaching scenarios.

The expected main outcome of this phase is the collaborative design of an educational intervention – a pedagogical innovation (see Appendix J). For this purpose, the teachers are divided into inter-campus groups in order to identify a significant educational problem and to discuss different perspectives of solutions. It is considered important to form the groups with teachers from different regional campuses in order for them to truly experience the process of communication and collaboration using networked technologies; and to expand teachers' professional and personal networks.

In this phase, the academics would focus on negotiating individualities and transforming themselves into a productive group with a common purpose. After defining the problem and finding a negotiated solution, it is expected that each teacher in the group "contextualizes" the solution to his/her field of expertise and particular context conditions. In order to facilitate the group work, each group of teachers will have a private space for group work in Moodle. Furthermore, for an appropriate distribution of responsibilities and tasks within the group, we recommend the following roles:

- Coordinator: Initiates the discussion and keeps it alive. Responsible for planning, promoting and organizing the tasks to be performed. He/she is also responsible for creating the facilities required (chat, forums, wikis) in the work space to establish a proper process of communication and collaboration.
- Researcher: Searches for material and information that supports the group in the project.
- Editor: Responsible for documenting the process, ideas and decisions made by the group. Responsible

for maintaining and updating all documentation to be generated internally within the group.

- Reporter: Responsible for communicating the results and the group progress to the other groups through the permanent forum “Group progress”. He/she is also responsible for updating the glossary of the community with important concepts.
- Facilitator: Ensures that all group members participate. Interacts with the other groups in the permanent forum “Group progress” and gives feedback to the group members. Responsible for raising questions and doubts to the community facilitator.

Figure 5.3 depicts the internal organization of the groups and the means of communication and interaction with the other groups.

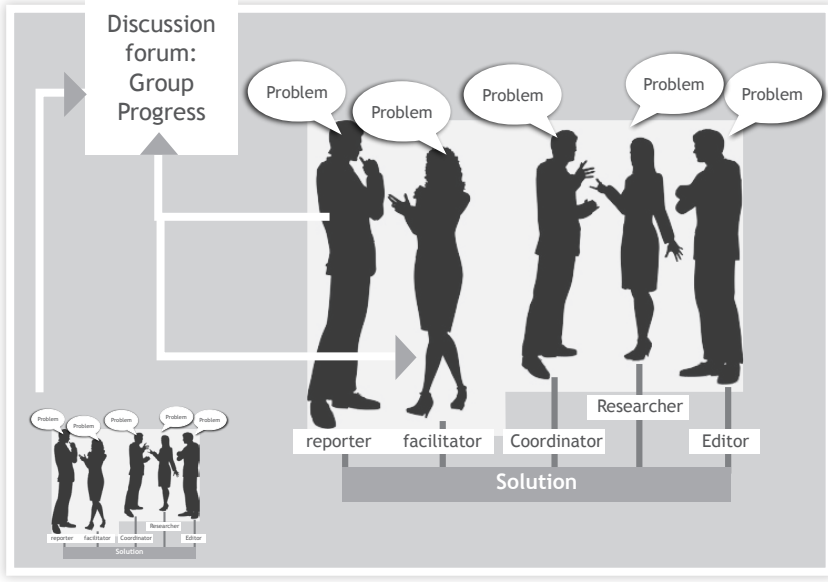


Figure 5.3 Group organization

It is expected that, at the end of this phase, each university teacher has a design and a plan to carry-out an intervention in their classrooms, considering tasks, resources, and organization. Beside the support from their member group, the teachers will receive permanent support from the community facilitator.

Phase 2: Experiencing the change

The goal of the second phase is to enable teachers to make meaning of their learning process from direct experience (Gallant, 2000; King, 2003). They will learn through engagement in the challenge of innovating their daily practice and through reflection on doing (Schön, 1987). In this phase, the teachers are going to experiment their re-designed practices with their students. In this process, the group work is still very important, the members will be encouraged to support each other and to discuss and solve problems emerged during the implementation of the innovation in the classrooms.

In this phase, no co-located meetings are planned. Teachers would mainly focus on the implementation of the pedagogical innovation. However, the constant interaction between the teachers is important in order to cultivate the community, trust and relationships. Thus, the online activities during this phase (July-September 2008) have as an objective to strengthen relationships among the teachers and to provide them with resources and experiences that enable them to effectively transform their practices in the classroom. Table 5.10 summarizes these activities.

Activity	Resources	Description	Date
Informal conversation	Chats	Informal conversations, various topics, clarifying doubts	Every Friday
Collective discussion: Challenges and opportunities of online learning	Readings, Discussion forum, Guest expert, Conceptual map	Online learning: advantages, limitations. New roles, UNA context, facilities, infrastructure, administrative organization, assessment policies.	July
Group work	Each group working space	Continuous peer support in the implementation of the pedagogical innovation	July-Sept
Collective discussion: Blended learning, online learning and face-to-face learning	Readings, Discussion forum, Video (expert presentation)	Advantages and limitations. Teacher and students roles, infrastructure, administrative organization	August
Reflection: blended learning	Personal blog	What did I learn from the video? Why is blended learning important for my practice?	August
Individual task: Learning assessment in online and blended learning environments	Power point (expert presentation), Evaluation rubrics	Creating an evaluating rubrics	August

Activity	Resources	Description	Date
Collective discussion: Design of educational materials	Readings, Discussion forum, Guest Expert	Designing educational materials for online and blended learning environments	August
Individual task: Design of educational materials	Power point (expert presentation), Guidelines	Creating learning material for online or blended courses	August
Collective discussion: Open dialogue	To be defined	An open discussion about a topic, theme or issue suggested by teachers	Sept
Individual task: Learning resources (Webquest)	Power point Guidelines	Creating a webquest	Sept
Group work: Learning resources (creating a video)	Software. Guidelines, Youtube	In groups, teachers of each regional campus create a video to let others know about their regional campus	Sept

Table 5.10 Experiencing the change phase: online activities

Phase 3: Understanding the change

This phase is centered on the teachers' reflection. Indeed, the goal of the third phase is twofold, firstly, for the learning process of the teachers to be truly effective, it is important that they can evaluate their experience with the pedagogical innovation and reflect upon it. Secondly, given the nature of the learning experience and the process of community cultivation fostered since the beginning, it is considered fundamental to understand the contribution of the community and the role of teacher participation within the community as enablers of teaching practice transformation.

This phase combines online and co-located activities, both of them oriented towards reflection and sharing of the results of the pedagogical innovation. Table 5.11 illustrates the online activities from October to November 2008.

In understanding the change process, we expect that teachers can really make meaning of their learning experience, and initiate a trajectory towards a more professional approach to teaching based on inquiry, action, reflection, evaluation, documentation and communication.

Regarding the pedagogical innovation, the teachers are asked for an evaluation considering their perspective, the students' perspective, the impact of the innovation and the institutional context. Moreover, they should reflect on their future teaching practice and the overall role

Activity	Resources	Description	Date
Informal conversation	Chats	Informal conversations, various topics, clarifying doubts	Every Friday
Individual task: learning about Communities of practice	Readings Examples	How to integrate the community concept on my classroom?	October
Individual task: systematizing the pedagogical innovation	Guidelines	Teacher's perspective, students' perspective, impact of the innovation, challenges, barrier, the institutional context	October
Collective discussion: the future of the community	Discussion forum	Reflect, discuss, argue and propose strategies for the development and sustainability of the community	October
Collective discussion: sharing experiences	Discussion forum	Lesson learned, achievements, results	November

Table 5.11 Understanding the change phase: online activities

of the community in the process. This reflection process will be shared with all the members of the community in the last co-located meeting. Table 5.12 shows the purpose of the co-located meetings in this phase.

Meeting/Workshop	Purpose	Date
- Chorotega (Nicoya and Liberia teachers) - Puntarenas (Marine Biology teachers) - Brunca (Pérez Zeledón and Coto teachers)	- Reflection workshops about the learning experience, the role of the community and the pedagogical innovation	October
Heredia central campus (all participant teachers)	- Social meeting - Dialogue with UNA authorities - Presentation of the pedagogical innovations - Reflection about the learning experience - The future of the community: development and sustainability strategy - Evaluation of the design	November

Table 5.12 Understanding the change phase: co-located activities

The role of the facilitator

The facilitator in this learning experience will be a member of UNA-Virtual. She is an experienced pedagogical advisor and has a master degree in Educational Technology. Her role is to support the teachers throughout their learning process. She will be in charge of providing direction to ensure a productive learning experience - modeling, guiding, reinforcing, reminding - but gradually increasing the teachers' ownership and decreasing facilitator control (Barab et al., 2002; Putnam & Borko, 2000).

The facilitator needs to be aware of the individual teachers' needs and support their active participation via online posts, e-mail, phone calls or personal contact. It is important that the teachers feel comfortable and know that help is available. Furthermore, it is expected that she will be able (together with the researcher) to observe and analyze the dynamics of the community, identifying sources of tension and bringing those concerns to the community to allow the teachers themselves to deal with the tensions and to manage them in a way that the community and the learning process can evolve.

The overall role of the facilitator during the three phases is to develop relationships in which teachers can experience meaningful learning and transform their teaching practices aligned with the new UNA institutional policies and current demands for higher education teachers.

After the learning framework of the professional development program was designed, it was uploaded onto Moodle that is the learning management system (LMS) used by UNA to support online courses or face-to-face courses enhanced by technology. The teachers are expected to work four hours per week in their own time, at work or at home. The duration of the educational intervention was designed for 32 weeks. A description of the initial design of the course, with objectives, topics to be covered, methodology, products, expected workload and norms of participation was given and discussed with the participating teachers in the first co-located meeting. To conclude this chapter, the following table (5.13) shows how the design guidelines are manifested in the design prototype solution that was presented in the preceding paragraphs. From this table, it can be seen the predominant role that has the pedagogical project (design, implementation, evaluation and communication of a pedagogical innovation supported by ICT and POPP) in achieving the desired professional development goals.

In the next chapter, an overall description of the intervention and how it was enacted by the teachers will be provided.

Dimension	Mode of belonging	Guidelines for implementation	Manifestation of guidelines in the designed educational intervention
Participation/ reification	Engagement	Facilitate a space to interact (physical and/ or virtual)	• Co-located meetings, online meeting space (community's website)
		Provide opportunities for group work	• Collaborative definition of a pedagogical intervention supported by ICT • Collaborative creation of a video
		Provide occasions for applying skills, conceive solutions, and making decisions	• Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
		Support a free circulation of information	• Open distribution of information and resources through the community' s website
		Support the formulation and solutions of problems that engage energy, creativity and inventiveness	• Design of a pedagogical innovation supported by ICT with a point of departure in an educational problem
		Provide resources and artifacts that support competence	• Readings, experts, discussions, tasks and projects
		Provide learning experiences to discover and apply educational technology	• Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
	Imagination	Offer activities to explore and try new things	• Participation in online discussions, blogs, wikis, chats, video-conferences • Creation of a weblog and a video • Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
		Provide problems in which resolution will give a feeling of competence in the educational setting	• Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
	Alignment	Provide opportunities to do something in concert with institutional initiatives	• Analysis and discussion of UNA pedagogical model • Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
Design/emerg.	Engagement	Define and contextualize the core concepts to be introduced in a way that connect with the teachers' interest and needs	• The core concepts (pedagogical innovation with ICT) are directly related to the interests and needs of teachers

Dimension	Mode of belonging	Guidelines for implementation	Manifestation of guidelines in the designed educational intervention
Designed/ emergent	Engagement	Define and contextualize the core concepts to be introduced in a way that connect with the teachers' interest and needs	• The core concepts (pedagogical innovation with ICT) are directly related to the interests and needs of teachers
		Introduce and discuss different pedagogical approaches to address teaching and learning processes	• Analysis and discussion of UNA pedagogical model, POPP, and online and blended learning
		Offer situations in which teachers actively take part in the generation of knowledge and can develop a sense of ownership in that production of knowledge	• Participation in online discussions, chats and blogs. • Creation of weblogs, wikis, and videos. • Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
		Promote collaboration, communication and dialogue as a means to develop understanding	• Collaborative definition of an pedagogical intervention supported by ICT • Collaborative creation of a video • Use of forums and chats for developing understanding of the learning concepts • Participation in co-located meetings
		Foster among teachers a sense of mutual responsibility about learning	• Collaborative definition of an pedagogical intervention supported by ICT • Activities where learning is gained from interaction with others: participation in online discussions and co-located meetings
		Allow the emergence of new participant structures and learning agendas	• Open and easy communication with the facilitator and researcher • Flexibility in the schedule for discussing emerging themes and topics
		Provide adequate time for participation, reflection and implementation	• The participation in online activities has a timeframe between 1-2 weeks. • The design, implementation and evaluation of the pedagogical innovation has a timeframe of 7 months.
		Encourage sharing of stories, experiences, and collaboration with colleagues, expanding professional and personal networks	• The content topics are related to teaching practice, allowing the exchange of experiences and stories • Online communication and co-located meetings which bring together all members of the community.
		Be timely, prolonged, ongoing and sustained	• The educational intervention has a period of 10 months, and a strategy to ensure continuity is participative designed within the community

Dimension	Mode of belonging	Guidelines for implementation	Manifestation of guidelines in the designed educational intervention
		Provide scaffolding to teachers based on their strengths	• Initial training face-to-face for teachers who are not sufficient experienced interacting in the online environment
	Imagination	Offer open-ended situations to give teachers opportunities to explore and to be inventive	• Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
		Encourage teachers to create their own teaching strategies using their previous and new knowledge	• Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
		Encourage a professional approach to teaching (reflection, inquiry, evaluation, documentation and communication)	• Fostering an approach resembling a scholarship of teaching throughout the project: design, implementation, evaluation and communication of a pedagogical innovation
	Alignment	Validate with teachers the concordance between their understanding of teaching-learning concepts and their classroom approaches	• Through discussions and negotiation of meaning among teachers and with experts
		Formulate, implement and evaluate educational projects aligned with institutional new policies	• The design, implementation, evaluation and communication of a pedagogical innovation supported by ICT is aligned with UNA pedagogical model and ICT educational policies
Local/ global	Engagement	Promote exchanges with experts	• Guest experts to participate in: Workshop POPP (international expert) and 5 discussion forums aimed at specific issues (national experts)
		Encourage teachers to communicate their experiences with broader audiences (conferences, seminars)	• Reporting of results and experiences in a face-to-face meeting with all participating teachers
		Invite experts from other practices	• Participation of experts from humanities, informatics, education and communication areas
		Open institutional spaces for teachers to influence institutional decisions and policies	• Participatory and collaborative definition of an institutional strategy for the sustainability of the community

Dimension	Mode of belonging	Guidelines for implementation	Manifestation of guidelines in the designed educational intervention
		Provide teachers with opportunities to enhance their status within the learning community (salary, academic career, university reward systems)	• To certify teachers for their participation in the community (which allows teachers to score in the institutional system of academic reward)
	Imagination	Enable teachers to adopt other perspectives outside of their own teaching practice	• Learning and negotiation about other pedagogical approaches (POPP) and modalities of learning (online/blended learning) • Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
		Envision links between teachers' classroom practices and broader educational practices	• Learning and negotiation about other pedagogical approaches (POPP) and modalities of learning (online/blended learning) • Negotiation of meaning with international experts as well with experts from other practices and areas. • Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
	Alignment	Make shifts or changes in practices based on new knowledge	• Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
		Converge around a common vision	• Discussions and negotiations about the core concepts and their viability to be implemented in UNA context
		Enforce new institutional policies or procedures	• Discussions and negotiations about UNA pedagogical model and UNA academic policies about ICT • Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT
		Be in touch with a broader context –regional, national and international	• The study is aligned with global trends in teacher professional development
		Remain tied to university reward systems	• The study is part of an institutional initiative and participation in it is rewarded with an academic institutional certification
		Have an influence in curriculum organization and development of institutional processes	• The study is the first institutional initiative in community-oriented professional development blended processes

Dimension	Mode of belonging	Guidelines for implementation	Manifestation of guidelines in the designed educational intervention
Identification/ negotiability	Engagement	Acknowledge teachers' individuality	• The educational intervention acknowledge teachers' educational background, prior experiences, area of expertise, attitudes toward change and innovation adoption, work constraints and their professional development goals
		Promote a climate of trust	• Developing relationships among participants (co-located meetings and online activities) • Building a sense of facilitator immediacy through continued presence on the online environment. • Using small groups to develop relationships • Enable teachers to share affectively by developing relationships.
		Encourage teachers to take risks	• Participation in new ways of learning and communication (a blended professional development process) • Change of teaching practice through the pedagogical innovation
		Provide a safe place to make errors and experiment	• Teachers experience the same kind of activities and tools that they will use with their students
		Sustain motivation	• Activities and topics to discuss that are relevant to teachers and integral to their current practice. • Motivation and continuous support by the facilitator
		Be flexible	• Acceptance of varying degrees of commitment in carrying out the tasks
		Promote generational encounters	• The age of the participating teachers vary in the range between 29 and 50
		Promote inter-regional campus encounters	• Teachers participating in the study come from five regional campuses • Two of the co-located meetings are "global" meetings with all participant teachers from the 5 regional campuses
	Imagination	Provide opportunities for critical reflection	• Through meta-reflection forums, and in the co-located meetings
		Provide opportunities to envision possible futures trajectories	• Design, implementation, evaluation and communication of a pedagogical innovation supported by ICT • Negotiation of meaning with experts and other teaching practices
		Encourage teachers to see themselves as leaders of the transformation of teaching practices	• Empowering teachers as agent of change through designing, implementing, evaluating, and communicating their pedagogical innovation within and outside their local context

Dimension	Mode of belonging	Guidelines for implementation	Manifestation of guidelines in the designed educational intervention
	Alignment	Provide opportunities for critical reflection and action about institutional policies	• Through analysis of UNA pedagogical model, UNA - ICT educational policies, and discussions about how UNA context is prepared to face new pedagogical approaches and modalities of learning
		Provide opportunities to understand the reasons underlying institutional policies	
		Support critical thinking over solutions and interpretations, especially by favoring different perspectives	• Group and community discussions • Critical analysis of teachers' pedagogical innovations

Table 5.13 Manifestation of the design guidelines in the educational intervention

Chapter 6

Describing the Intervention

Not only is the researcher obligated to fully describe the tools he or she may have built, but also relate as fully as possible the context in which the tools are being studied, the activities and practices offered to the users and, most importantly, the evolution of the context over time in response to the tools.

(Hoadley, 2002)

Describing the Intervention

The study presented in this thesis is a study of a process of learning and community-building. The university teachers participating in the study worked together to learn new pedagogical approaches and educational technology that would help them to change their practice. Their story is formed over several months, from February to November 2008. In this chapter, I aim to tell that story, giving the reader a taste of how the initial design of the intervention evolved and how it was experienced by the teachers. The story has a narrative form (Hoadley, 2002), communicating a series of related events, the context and the intentions that drive the actions, and describing the history and evolution of the design over time. In many instances, I use the words of the participants to better express the meanings of their experience.

This chapter is not an analysis. I do not pretend to analyze the information from a theoretical point of view (it will be done in the following chapters), but rather present an account of how the design of the intervention was enacted by the participating teachers, how they appropriate and negotiate different meanings about their learning, identity and trajectory. Both, failures and successes are documented, as they help to a better understanding of the relationship between the theory and the context (Design-Based Research Collective, 2003)

The reconstruction of the story is based on multiple sources: preliminary reports (Coto & Mora, 2008); reflection workshops and meetings; online participation in discussion forums and chats, questionnaires and interviews. The story is told on the basis of a systematic work with those data and focuses on main events, difficulties, successes, participant experiences and the context. In order to facilitate the writing but also the understanding, I have split the ten months period of the intervention into five blocks of two months each.

The intention of this chapter is then, to report the intervention in a way that can be traced by others, enabling the readers to understand the findings and to evaluate by themselves their potential appropriateness for similar settings.

6.1. Getting to Know Each Other: February – March 2008

The community life began in the last week of February with a co-located training session in each regional center, 24 teachers in three different groups participated in this meeting. As it was the first

meeting, the facilitator informed teachers about the project and the expected commitment from them. Additionally, in the computer lab, teachers learned about Moodle, the UNA virtual-classroom and then they practiced their basic facilities.

The first impressions of this meeting were, as reported by the facilitator, that the teachers were motivated and interested in joining a community that would enable them to share experiences in different areas of knowledge with colleagues from the regional campuses. They also expressed the need to learn how to introduce ICT in their practice and showed interest in developing research projects supported by ICT. On the other hand, the teachers expressed some concerns with regard to teamwork and the roles to be assumed within it, as well as copyright issues in the group work. The teachers also asked for the possibility of receiving a certificate for their participation. This certificate would serve as a rating in the institutional academic reward system (Corrales Mora, 2008).

At the beginning of March, the online life within the community began. We employed several strategies to facilitate the building of the learning community. The teachers were invited to introduce themselves to other participants through writing personal interests, professional backgrounds and trajectories in a personal blog. At the same time, a discussion forum was opened in which the teachers were invited to express their expectations and what they wanted to learn from their participation in the project. They were encouraged to upload a picture to make their presentation more personal and friendly. Both, the blog and the forum enabled the teachers to get to know each other. Seventy percent of the teachers had no previous experiences with online learning environments, so in order to motivate them and to model the process, the facilitator and researcher initiated the process, writing their personal and professional trajectories, and providing guidelines for posting to the blog and the forum. Two teachers expressed their expectations as

> *[David] In the personal, transcend spatial boundaries and meet with colleagues that share the same expectations. In the professional, be a better academic within a society that demands awareness of new technologies. In the social, learn new perspectives that help me define my personal mission, and in the technological, learn about new software, tools and learning systems to apply in my professional career (Forum: My expectations in this learning experience, March 2008).*

> *[Lorena] Being part of this learning experience would mean enter into the dynamics of a world that moves daily through technology. It is a challenge for those of us who have not been prepared for this digital world (Forum: My expectations in this*

learning experience, March 2008)

In total, this forum generated 19 posts (see Table 6.1). In this initial experience, participating in a discussion forum and by the nature of the forum itself, each teacher contributed with only one post. The figure 6.1, as well as the other similar figures in this chapter, shows the thread of the discussion by indicating how was the dynamic of the participation between teachers, facilitator, and in some cases, guest experts. By following the thread and its depth, we can establish whether was a "conversation" or just an opinion with no or few feedback from others. In this forum, the number of teachers that read and posted messages were 18, and 7 more teachers read the postings but did not produce any post.

Teachers participating		Teachers´posts	Facilitator´s posts
Observing and producing	Observing	18	1
18	7		

Table 6.1 Participation discussion forum: my expectations in this learning experience

The facilitator summarizes the teachers' expectations in the following aspects: learning about ICT and its application in education; being part of a collective learning process; reflecting on the changing role of teachers; professional and personal growth; taking advantage of the institutional technological tools; promoting students' meaningful learning and establishing links between regional campuses and between teachers. These shared expectations are seen as a good point of departure to establish a joint enterprise and to help define the identity of the community as e.g. what is the nature of learning that the teachers want to achieve?; Which activities, tasks and projects are the teachers interested in undertaking as a group?, Which are the benefits in belonging and participating in the community?; And, how can the community contribute to the institutional mission and vision?

Another activity that was introduced in this period was the "Friday chat" space. It was conceived as a weekly space of two hours with the participation of the facilitator for clarifying doubts and questions about the readings or assigned tasks. However, most of the sessions became forums for social conversations where teachers discussed various topics not directly related with the initial objective of the chat. The synchronous communication was useful to support the teachers' informal conversations, but the messy nature of the chats also created

Figure 6.1 Discussion thread: my expectations in this learning experience

confusion.

> *[Nora] .. for me this is a bit strange, I find it difficult to set up a conversation, don't you? (chat, March 7)*

Still, those feelings of chaos in participation in chats and discussion forums offered the teachers opportunities to experiment with these tools as pedagogical resources, analyzing strengths and weaknesses before using them in their classrooms. These little achievements helped the teachers to feel more confident with the use of technology.

> *[Silvia] ... well, as far as I'm concerned, getting used to this will take a while for me, I think it will not be tomorrow that I tell my students, today we will CHAT! But at least now I intend to do it (chat, March 7)*

One of the important goals of the project is to expose teachers to imagination -new visions and perspectives- about teaching practices. For this purpose, in the third week of March, 27 teachers participated in the second co-located meeting. The meeting was designed as a workshop to introduce teachers to the POPP approach; it was conducted by an international expert and was carried-out in each regional center. In the workshop, the teachers worked in groups in an exercise called mini-project, formulating strategies for dealing with a curriculum based on the POPP approach. The teachers were motivated by the expert to focus

on issues related with their regional context and how the curriculum can help in formulating, researching and proposing solutions to problems that affect each particular region.

Figure 6.2 Workshop POPP- Sede Brunca

From this workshop, the expert reported that (1) there was strong motivation and commitment among the groups; (2) the groups proposed different strategies for implementing the pedagogical approach, from a single course to involving the redesign of a semester under a specific topic; (3) there was a very good handling of the concepts and ideas that support POPP; (4) in general, the teachers were familiar with the approach and what seemed new to them was the synergy that is generated through discussions and the reformulation of courses in conjunction with colleagues and by integrating different disciplines under the common goal of the formulation of problems and work on projects; (5) the teachers had strong arguments about the need to move towards more student-centered learning approaches, but they also required some infrastructure to support the implementation of the approach, for example the physical distribution of many of the classrooms are more oriented to approaches where the teacher plays the main role in the learning process (Dirckinck-Holmfeld, 2008).

As a complement of the workshop, a discussion forum was opened for teachers to continue discussing and sharing thoughts about the approach. In this forum, 13 teachers took part in the discussion with a total of 21 postings (Table 6.2). In this subject-oriented discussion the researcher had participation. It was because the POPP is a pedagogical approach used in Denmark, and teachers were curious about how it works.

The discussion thread began with the contribution of a conceptual map in Spanish produced by one of the participants about one of the core

Teachers participating		Teachers´ posts	Facilitator´s posts	Researcher´s posts
Observing and producing	Observing	21	5	3
13	8			

Table 6.2 Participation discussion forum: POPP

readings that was in English. In the discussion it was evident again that the teachers felt familiar with the pedagogical approach. They expressed having partially implemented POPBL in their courses, without having fully incorporated the theoretical foundations of it, but acknowledging the results on students' learning.

[Nidia] Somehow, though not with the name of POPP, I have been using a lot the mechanisms and principles of this pedagogical approach. I think that because I am an anthropologist and closely linked to applied anthropology, I have found it easy and necessary to implement the project concept in my courses (Forum: POPP, March 2008).

[Susan] I have tried to apply something similar to POPP in my course. Of course after the workshop I realized that I must make some changes, particularly in teamwork. The approach to the problem is something that I intended students to do individually, but then all the development work is in groups. I have obtained interesting results, and even though the students believe that it takes much effort, at the end, they are satisfied" (Forum: POPP, March 2008).

The teachers' contributions reflect a critical analysis of the readings, an appropriation of the topic and an analysis on how to apply it to their disciplinary areas, their courses, their teaching and the institutional environment. To support their opinions, the teachers use several resources such as their own experience, the assigned readings, new literature and new data. The figure 6.3 shows the development of the discussion thread. The main concerns of the teachers about this topic reside in the difficulties that they may face in implementing the approach within an educational system which, according to them, (1) predominates a rigid structure of the evaluation systems favoring exams; (2) students are used to a traditional teacher-centered pedagogical approach and to be evaluated mainly through exams; (3) the teachers are not formally prepared to use student-centered approaches; (4) institutional and administrative systems are not flexible enough to truly integrate this kind of innovative approaches.

Figure 6.3 Discussion thread: POPP

Learning from and for the design

From the analysis of this period, we introduce three modifications in the design.

(1) Given the apparent need for teachers to have more informal conversations and, on the other hand the need for the facilitator to answers questions and to learn whether the teachers were experiencing difficulties, a new permanent chat, UNA-chat, was opened to offer opportunities to meet synchronously not only on Fridays. In addition, and in order to raise social presence, the facilitator invited the teachers to use the synchronous space when they visited the community to reduce the feelings of isolation that tends to be generated in online spaces.

Learning from and for the design

(2) Creation of a new space "Informative Blackboard" where the researchers upload preliminary reports of the community learning process. Sharing these results with the participants have multiple purposes: a-) refinement of the design of the educational intervention based on the analysis of the different activities, and the levels of participation and interest that the activity causes on teachers; b-) facilitation of reflection among the members about the level of engagement and identification with the community; c-) provision of information that contributes to a better understanding of the community behavior and facilitates the defining of an identity as a community; and d-) creation of an ongoing process of validation of results based on feedback from the participants.

6.2. The Collaborative Work: April – May 2008

In this period, we introduced the formation of the groups in order for the teachers to have enough time to get used to work in groups and to start the collaborative design of the pedagogical project to be implemented in classrooms after the holidays of July. The groups were formed by the facilitator considering their geographical distribution, academic and technological profile, and teaching experience. The objective was to create a balance that allowed the members of the group to help each other in the learning process. As it was explained in chapter five, the reasons for creating inter-campus groups were to promote the relationships between regional campuses, and to enable teachers to truly experience the process of communication and collaboration using networked technologies. The facilitator provided guidelines to support the group organization and appointed a coordinator in each group as responsible for creating the initial facilities to establish communication. A private work space for each group was created in Moodle. As further support to the group work, a document with guidelines and templates to orient the design, development and evaluation of the pedagogical innovation project was uploaded in the learning platform (see Appendix J).

Each group had the initial tasks of defining a name and logo, to assign the roles (coordinator, researcher, editor, reporter and facilitator) and to establish an internal work plan. Initially, one week was scheduled to perform these tasks but, given the lack of progress, we decided to extend the deadline with one more week. At the same time, the facilitator and the researcher gave direct support (through chat sessions and phone calls) to the coordinators in the creation of the initial

facilities. However, after two weeks, the progress of the groups was very irregular. The coordinators of five out of the six groups set up various activities to promote the participation of the group members and three of them started to use email messages to motivate and inform the group members. This strategy seemed to give good results, possibly due to the fact that the email was already part of daily routines. However, even when the participation rose, none of the groups succeeded in making decisions that helped them conclude the assigned tasks. Moreover, in cases where the presence of the coordinator was weak, the other members were undecided on the attitude to take, whether to take the initiative or wait for the coordinator to take the first step.

Following the principle of empowering teachers to take control of their learning process and to make decisions (Lawler & King, 2000; Lawler & King, 2003; Wing Lai et al., 2006), we decided to present the problem of low participation and progress to them. So, in order to analyze these issues with the teachers, a new discussion forum was opened and two chat sessions were also dedicated to analyze the situation. The forum and the chat sessions were a space for the teachers to voice their concerns and propose solutions that could help them cope with their difficulties. For some teachers, the motivation was considered an essential aspect affecting participation; however other participants argued that it was not lack of motivation what made the participation difficult but lack of time, lack of technological competences, lack of familiarity with online learning, and personal problems of organizing participation in the community with their multiple activities as academics. Some teachers also expressed a feeling of disorientation when entering the system; they had no clarity about the task or what they should do, and this issue together with a feeling of being alone was discouraging. Some of teachers' thoughts were expressed in the following way:

> *[Marta] .. although many of you would not believe me, ….for me writing in this forum is a triumph …although time has been an important factor in limiting my participation, the main factor is the lack of knowledge of the platform because it is an entirely new experience for me (Forum, Participation in the community, April 2008).*
>
> *[Lucas] I want to emphasize the motivation that is needed to be part of this community …unfortunately not everyone is motivated. I believe that motivation is a determining factor and this must come from the individual. To me those who do not want to participate need to decide whether or not to continue in the community and not hinder the work of the groups (Forum, Participation in the community, April 2008).*
>
> *[Allan] I'm lost; I do not know, neither understand what is happening (chat, Abril 11).*

One of the main problems in the group organization was the lack of decisions. Coordinators spend a lot of time in trying to set up a chat session to distribute roles and tasks. For example, one of the groups spent more than three weeks of trying to set up a synchronous conversation to make decisions. This situation was frustrating for the teachers, debilitating for the groups and even led some teachers to leave the community.

> *[Nora] Good afternoon. Sorry for the inconvenience, but as far as I understood the day that we made contact by the Yahoo email, the chat would be Wednesday or Thursday at 8:30 pm, now I realized that it took place the 28th, ...I do not know when I have to be here...for example, today I was going to San Jose, but I stayed here to participate and organize the work, but now I see that we are not going to chat.., so how could we solve this issue?..... If you have arranged another day, how could I know?. I think I'd better give up...I have many other obligations. Tell me if I'd better leave the group, in order not to interfere with development of the work. Greetings (Group working space, April 2008).*

To overcome this kind of situation, we pushed teachers to use asynchronous means to communicate and to organize the group work. Three of the groups showed some progress, but the lack of decision was still a problem. Given this situation, in one of the chat sessions, we addressed teachers about the convenience of reorganizing groups in a more campus-based way, in order to solve some of the online communication problems. However, in the chat-dialogue, the teachers argued in favor of continuing working with the structure of inter-campus groups.

> *[Silvia] It would lose the sense of using technology to communicate; we would be back to square one, to take a coffee and take notes in a notebook. I know it does not sound good but what then would be the purpose of this project? (chat, April 11).*

> *[Marta] Change the group - I think not, but at least to develop some of the activities with colleagues from the campus. I see it as a need, as an example, to accept the offer of David to work face-to-face together once a week here in PZ (chat, April 11).*

It was worth noticing that teachers who showed high levels of participation considered motivation as a key element to overcome the problems of lack of both, time and knowledge of the online learning system. They expressed their disappointment and frustration regarding the low participation of colleagues within the group, but also recognized that it requires time to become familiar and feel comfortable with the use of online systems, so they still keept high expectations with their participation in the community.

At the end of the chat session on April 11, the following conclusions were reached among the teachers regarding the formation of groups and the different strategies to support its consolidation.

- Maintain the formation of groups as they were, with the aim of promoting relationships inter-campus and the use of ICT for communication and collaboration among group members.
- Open spaces for collaboration among colleagues in the same regional campus, especially related with the use of the MOODLE System and UNA virtual classroom.

Additionally, in order to support the group work, we decided to provide a more close scaffolding to the groups, through (1) creating detailed guidelines to support the creation of facilities in each group space; (2) using email and phone calls to motivate teachers to participate; (3) fostering the use of asynchronous facilities for decision making; (4) providing more support and orientation to coordinators; and (5) in cases where the coordinator had not participated, selecting another coordinator and guiding him/her in the setup of initial facilities.

However, in despite of huge efforts from the facilitator and researcher, at the end of April, the groups continued struggling with their work. Four groups had made progress in defining an identity for the group (name and logo), defining roles and beginning to conceptualize the educational problem to address in the pedagogical innovation, but the other two groups did not show any progress.

> *[Mario] I think my group is not working well ... the participation is little or none ... and it discourages those participating.... I think it was necessary to take action, such as to know whether these people will continue participating or not and if not, then reorganize the groups (chat, April 25)*

Due to this situation and the relevant role of the groups in the realization of the pedagogical project, we decided to rearrange the groups merging the participants in the four groups that showed more progress and in some cases naming new coordinators and redistributing roles. This decision seemed to work for some time. In the beginning of May, the new groups began to discuss the design of the pedagogical innovation. The new coordinators created a variety of resources to support discussion and decision making. However, the following problems were still limiting the progress:

- In two of the groups, only three and four members out of seven participated actively. The remaining members

showed only peripheral participation, sometimes reading the discussion but not making any personal contribution. Only in very few cases, the teachers were not involved at all.

- It was difficult for the groups to make decisions and for some coordinators to take and exercise leadership. Other coordinators, in order to advance the work, decided by themselves or with the contribution of just one other member.
- Many teachers preferred synchronous communication, so the groups invested a considerable amount of time trying to schedule a dialogue. This process has proven difficult and complex but it is consistent with the need for teachers to establish a personal contact.
- The low participation of some members influenced the participation of the most active members as the last two weeks a decrease in participation of the latter could be noticed.

In the third week of May, the groups seemed to agree on the theme that they will work in the pedagogical innovation. Then, the following step for the groups was building a common understanding on the topic and generating a creative "solution" to the identified problem, considering how innovative, pedagogical approaches and technologies can help in this process. This phase required a collaborative learning and reflection-oriented process.

As a complementary strategy to foster participation, the facilitator organized some local meetings on the campuses. For example, one of the teachers from Nicoya, pointed by the facilitator, met on May 16th with teachers from Nicoya and on May 22nd with teachers from Liberia. In these meetings, they discussed the experience of belonging to the community, the challenges that they were facing and how to overcome the problems (Teacher report, May 27th). Ten teachers participated in these meetings and all but one valued the experience positively; however they stressed the lack of familiarity with online learning and technological tools, the lack of time, and the lack of individual support as elements that limited their engagement. Teachers claimed more co-located meetings, more training support and less tasks and readings.

In addition to these co-located meetings, we decided to carry-out a training session through video-conference with participants of the Brunca regional center. However, two attempts were made at the end of May and none succeed due to technical problems - once in the regional

campus and once in the central campus.

In the period from April to May, the teachers participated in three topic-oriented discussion forums besides the group work. In the following, I will briefly sketch these in three dimensions: objective, facilitation and participation. The goal of the discussion forums, the reading and the complementary material was to provide the teachers with tools to design the pedagogical innovation.

Forum: Internet and education

Objective: The aim of this forum was to exchange thoughts about the educational importance of the Internet and how to incorporate this technology in higher education. For this forum, we invited an expert in Education with a specialization in pedagogical mediation.

Facilitation: In preparation for the forum, the teachers had access to two readings and a conceptual map elaborated by the guest expert about one of the readings. The expert also developed a set of five guiding questions to orient the discussion and encouraged the teachers to imagine a professional profile of an academic who is willing to design meaningful learning process using new technologies. This forum was the first one in the project in which the teachers interacted with an expert guest. The role that the expert developed in the forum focused on two aspects: to give an individual feedback to teachers and to generate questions to re-orient or further the discussion.

Participation: In total, this forum generated 40 posts (see Table 6.3). Fourteen teachers contributed with postings for a total of 29 comments. The expert made 7 postings and the facilitator participated with 4 interventions. In this initial experience with participation of an expert, the dynamics of the forum were focused on teachers answering the guiding questions.

Teachers participating		Teachers´ posts	Facilitator´s posts	Expert´s posts
Observing and producing	Observing	29	4	7
14	6			

Table 6.3 Participation Discussion Forum: Internet and its potential in educational processes

Most of the posts within the 'thread' were generated by the expert's questions on how to integrate ICT in the educational process considering both the social and pedagogical aspects. In answering the guiding questions, the teachers used several resources such as their own experience, the readings, new literature and new data.

For example, the first participant made reference to new literature to support his position about how to responsibly introduce ICT in education:

> *[David] Given this new paradigm, tool, fashion, or whatever you call it, we need to face it and in order to do this we need the three conditions proposed by Fainholc to develop a relationship between pedagogy and technology to achieve an understanding of what it means to integrate ICT in education (Forum: Internet and education, April 2008).*

Another teacher referred to one of the readings to reflect her own position regarding her competences

> *[Silvia] I would like to express how well I felt when I read the article of UNESCO "ICT Competency Standards for Teachers" because I could locate myself in one of the levels which - though not high - at least I know that I am trying to reach the next level. Through this article, I realized that at least I have a level and that my struggling to understand this new approach to educational ICT has only one purpose, to integrate it in my teaching practice in the near future (Forum: Internet and education, April 2008).*

Figure 6.4 shows how the discussion thread developed among the teachers. It displays how some teachers began to establish a dialogue and to participate with more than one posting. In the discussion, the teachers were cautious regarding the proper inclusion of ICT within the teaching-learning process. They agreed on the educational advantages of integrating technology if it is properly addressed with pedagogical objectives. To integrate technology in their practice is a challenge and an opportunity for professional development.

Forum: Project-Based Learning

Objective: The aim of this forum was to open a space for reflection on the project-based learning approach and its potential use in higher education. This forum could be seen as a complement to the discussion about POPP/POPBL. We invited a national expert on Education with a long trajectory in the approach to facilitate the discussion.

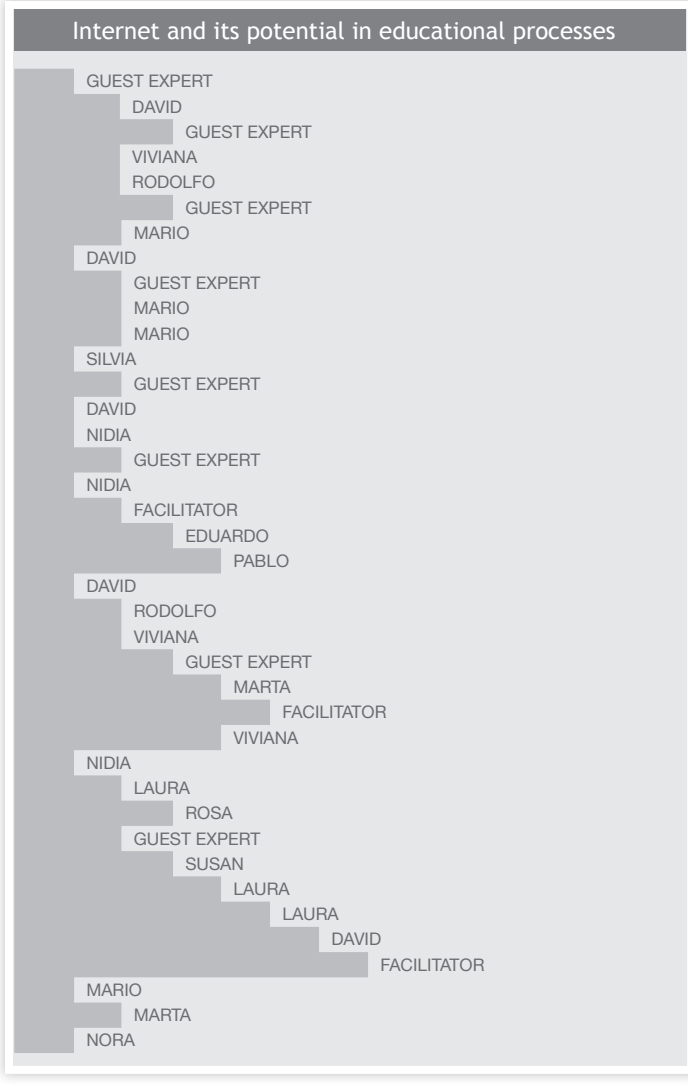


Figure 6.4 Discussion thread: Internet and its potential in educational processes

Facilitation: In this case, there were no initial guiding questions. We requested teachers to participate with at least two interventions: a question to the expert and a critical response to one of the participants. The role of the expert was to share her experiences and to invite teachers to reflect on the characteristics and learning needs of the new generations of young students at the university.

Participation: This forum had a lower level of participation than the previous. It generated 35 posts in total (see Table 6.4). Eight teachers participated in the discussion, the expert made 8 postings and the facilitator participated with 4 interventions.

Teachers participating		Teachers´ posts	Facilitator´s posts	Expert´s posts
Contribuiting	Observing	23	4	8
8	2			

Table 6.4 Participation discussion forum: project-based learning

In the discussion, several topics arose like teacher training, learning assessment, the educational benefits of the approach, and the possibilities and difficulties in implementing the approach in the UNA context.

Some of the questions and concerns of the teachers are expressed in the following interventions:

> *[Viviana] What are the skills that a teacher must have to conduct a successful experience of teaching and learning through the development of projects? (Forum: Project based learning, May 2008).*
>
> *[Rosa] How to overcome the learning techniques to which students are accustomed? How to convince students of the importance of producing and not just going through the classroom to get a title? (Forum: Project based learning, May 2008).*
>
> *[Marta] How to overcome an evaluation system that is so traditional and sometimes behaves so radically? How can the university system be flexible and how can students adapt to this model? (Forum: Project based learning, May 2008).*

Among the difficulties mentioned by the teachers are the rigid structure of the assessment systems, the use of examinations as prevailing tools of assessment and the fact that the students are used to traditional approaches to teaching and evaluation. In this respect, one teacher comments:

> *[Mario] I think the difficulty often lies not in the student but in the rigid structure of the assessment systems... with tests as the only means of evaluating the learning process (Forum: Project based learning, May 2008).*

Regarding to the educational advantages of the approach, the

teachers mentioned teamwork, problem solving, the close relation with real life, and the ability to create learning communities where teachers do not have the leading role but are involved as students themselves in a process of learning together. They further emphasize the teachers' attitude when they face new challenges such as the introduction of technology and innovative approaches in education.

> *[Laura] …. a deep change in the pedagogical practices is necessary, in order to create an environment that allows people to grow in the society …, and the educational process to be a challenge for the learners……. (Forum: Project based learning, May 2008).*

With regard to institutional support for the introduction of a new pedagogical approach, the participants expressed two main aspects: to provide opportunities for pedagogical training and more flexible administrative and evaluation structures. The creation of groups or learning communities to share knowledge and experiences among teachers were discussed as an alternative to support the academics. The teachers' contributions show their desire to change, but also show their concern with the traditional education system, the resistance to change, and the assessment system.

In figure 6.5, the evolution of the thread can be seen. Even though only eight teachers participated in the forum, six of them made more than two interventions creating a rich dialogue and discussion among the participants. The expert played an important role, motivating the teachers to present their opinions and to break paradigms and take risks.

Forum: UNA pedagogical model

Objective: To begin a process of analysis and reflection on the pedagogical principles that orient the institutional academic practice. For this purpose, we invited a professional with broad experience with the UNA pedagogical model to guide the discussion. The principles of the pedagogical model of UNA were explained in chapter 3.

Facilitation: For this forum, the guest expert together with the facilitator developed a group of questions. Two questions were assigned to each group of teachers and they were asked to respond to both of them. The expert encouraged the teachers to read and feel the model and to understand it in ways that were meaningful for them.

Participation: The number of teachers that read and posted messages in this forum were 10, and 2 more teachers read the postings but did not produce any post. The expert made 3 postings and the facilitator

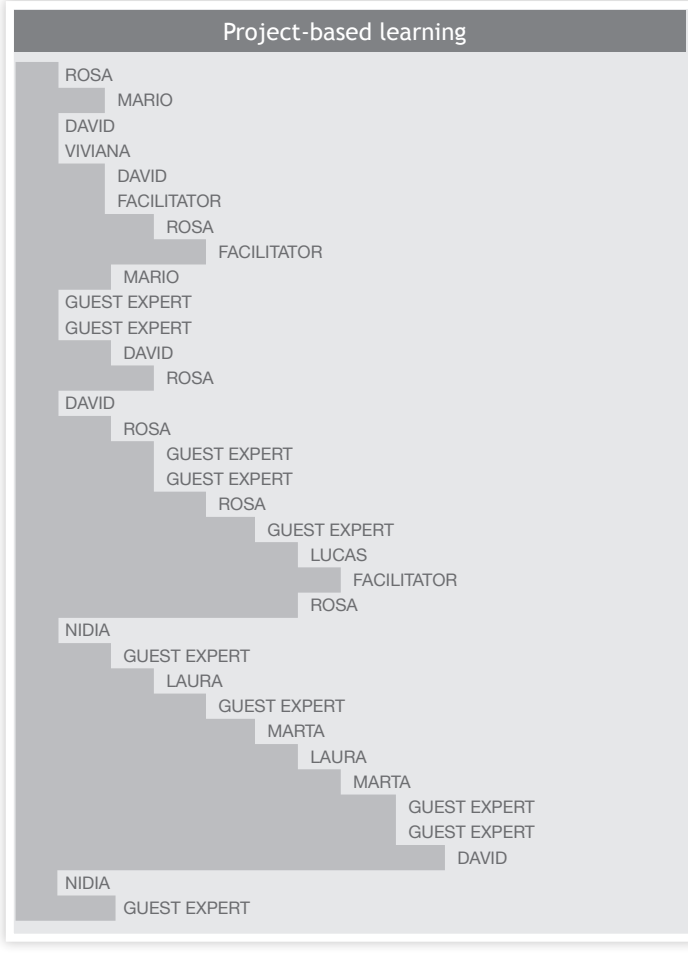


Figure 6.5 Discussion thread: Project-based learning

participated with 2 interventions for a total of 24 contributions (see Table 6.5).

In the discussion, the teachers agreed that the pedagogical model was flexible and gave room for creativity, diversity and innovation. They expressed that the model was enacted in the classroom and that both teachers and students were responsible for "giving color and life" to the model. One teacher also commented about the role of technology in the implementation of the model.

> *[Tom] The pedagogical model raises some very good things for the students, for example, it allows the students to be part of a learning community where everybody learn (teacher-student) and everybody teach, thus promoting an interaction between*

Teachers participating		Teachers´ posts	Facilitator´s posts	Expert´s posts
Observing and producing	Observing	19	2	3
10	2			

Table 6.5 Participation discussion forum: UNA pedagogical model

> *teacher, students and knowledge, and it is on this last aspect where technology can act as an agent of change by improving the interaction between these three elements (Forum: UNA pedagogical model, May 2008).*

Furthermore, the teachers argued for the need of spaces for understanding the model, appropriate it and thus be able to implement it.

> *[Viviana]….it is not enough for us to know the university pedagogical model neither to learn approaches such as PBL or POPBL, if we do not internalize it. It is necessary to learn from successful stories, how they were conducted, and then putting it into practice ourselves. Hence the proposal of the University to train teachers and facilitate learning environments should be crucial for an accurate implementation of this model (Forum: UNA pedagogical model, May 2008).*

In understanding the pedagogical model and how to "live it", the teachers pointed out big differences among the participants with pedagogical formation and those that do not have it.

> *[Rosa] ….many of us are professionals in different fields but not in pedagogy. And we can see this impact precisely in analyzing the model, those colleagues who are educators by profession find very easy to implement the model, but it is much more difficult for those of us who do not have that training (Forum: UNA pedagogical model, May 2008).*

The differences pointed out by this teacher are reinforced by the discourse used by teachers with educational background, for example

> *[Laura] By its political nature the pedagogical model allows me to propose a specific methodology to work "from within" the educational change. It gives me the opportunity to use a language, meanings and collective practices in a creative way, allowing students to think and act differently. Unconstrained dialogue forms a willingness to change. A recent contribution in the field of critical pedagogy is the limits to pedagogy proposed by Giroux. Habermas and Giddens agree that the emancipator social project of modernity has yet to be complete. They believe*

that an actually liberating educational project must take into account both individual subjectivity and the influence of the dynamics of class, gender and ethnicity. The interplay between individual biography and social components of identity is what ultimately allows a thorough knowledge of subjects and is taken as reference to pedagogical work (Forum: UNA pedagogical model, May 2008).

Figure 6.6 shows how the discussion thread developed among teachers. In this forum, the participation of the expert is less central. Teachers referred to others' comments to reinforce, discuss or further the topic. The dialogue between the teachers demonstrated both their interest in the UNA pedagogical model, and their concern about an adequate implementation of it in class.

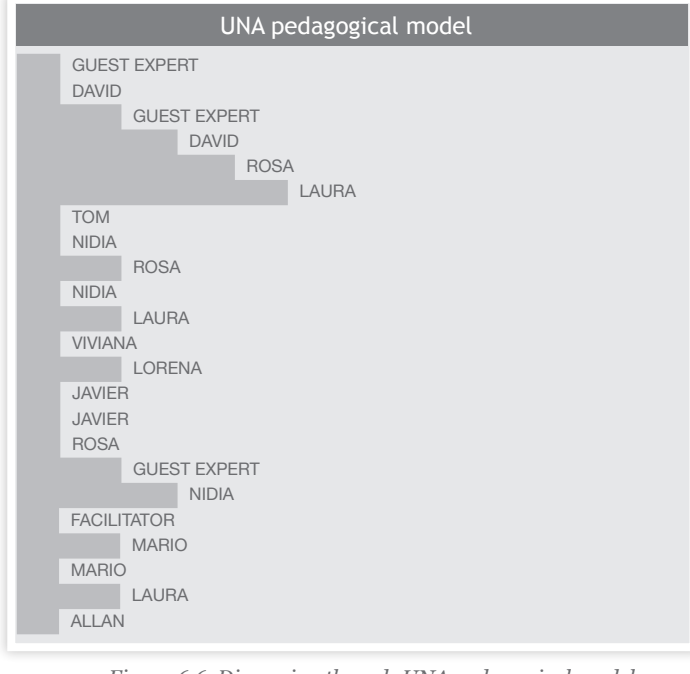


Figure 6.6 Discussion thread: UNA pedagogical model

Learning from and for the design

The biggest challenge in this period was to promote the work progress of the groups. In order to achieve this, we took a series of decisions, most of which are explained above.

Learning from and for the design

- Provide more close support and orientation to the groups.

- Promote the use of alternative means of communication, skype, email and telephone

- Foster the use of asynchronous facilities for decision making.

- To reduce the amount of weekly tasks.

- Organize spaces for collaboration between teachers in each regional campus. In order to strengthen the sense of belonging to the community, at this point it was considered important to foster the building of supporting and sharing relationships among colleagues from the same campus.

- Organize online training sessions with groups of teachers.

6.3. Building a Community: June – July 2008

After twelve weeks of having begun the learning experience, there was a mix of achievements and challenges, shared experiences and learning, motivation and frustration, interest and disinterest. The teachers expressed problems of time, Internet access, lack of clarity in the tasks, overload of tasks, and lack of mastery of technological tools as parts of the difficulties they faced in the process. At the same time, the teachers valued the opportunity that this project provided, thus most of the teachers involved in the community, even if their participation was very peripheral, continued expressing a desire to become active members increasing their levels of participation.

> *[Laura] My commitment is to catch up, I do not want to get out of the community or that you send me out (First co-located meeting, June 2008).*

For many teachers, this was their first experience with online learning. Their conceptualization of communication and collaborative work was related to face-to-face experiences. The new experience invited them to re-conceptualize these concepts in a way that enabled them to participate in online collaborative work. Without neglecting the importance of the face-to-face contact, we challenged teachers, in this period, to change their expectation of wanting to meet people whenever they entered into the community and of finding inputs and comments that engaged them in discussion and negotiation of meanings. In other words, we motivated teachers to appreciate and enjoy the asynchronous communication, and use it as a productive means to reflect, share and learn.

At this point, it was clear that the teachers required a longer and ongoing induction process to become familiar with the new learning environments. Furthermore, some design decisions, such as to let the groups organize by themselves were questioned by some teachers.

> *[Nidia] In my previous blog, I reflected on the need that the roles in the group were assigned the first time by the facilitator. With the experience of 3 weeks as part of the group [group number], I think that it would be the strategy that I would use as a teacher. I think the students would feel confused if they are not totally guided the first time (Nidia personal blog).*

During June, we expected that the groups consolidated their work; however it was evident that the lack of decision making was affecting the engagement of many teachers, especially the more active. The non-active participation was a permanent discussion topic in every chat. Thus, our initial goal of establishing collaborative work where each group designed a pedagogical intervention and then, using this collaborative design as a frame of reference, each teacher could adjust the design to his/her own courses and area of expertise, was changed to a less ambitious goal where each teacher decided and designed their own pedagogical innovation and used the group to get feedback and recommendations.

At the end of June, the first global, co-located meeting took place in the central campus of the university. Our expectations for this meeting were very high because it was the first meeting with all the participants. Until this point, ten teachers had left the process arguing multiple academic tasks and lack of time to engage and accomplish all the required tasks.

There were many topics that we wanted to discuss in this meeting, but the available time was a constraint. Initially, the meeting was planned to last four hours but the teachers could only participate for a period of three hours due to the weather conditions at that time and the geographical distance between their work centers and the central campus.

The purposes of the session were: (1) to strengthen the building of relationships between the teachers; (2) to have a short training session in the computer lab regarding the use of wikis; (3) to analyze actions and strategies that facilitate the methodological approach to the pedagogical innovation; (4) to reflect on the learning process and analyze issues of participation and commitment to the community, and (5) to evaluate the design of the intervention and to suggest modifications (this was done mainly through a questionnaire). In order to promote reflection, a report with the individual participation in all the activities until June

20th was provided to each teacher, and some graphics about global participation were also presented.

As extra-activity in this meeting, we planned a contest to choose a name for the community. For this purpose, a forum was opened a week before for participants to suggest possible names. During the meeting, the participants suggested eight different names and then they voted. The name that was chosen was UNAgora that comes from joining "UNA" and "ágora" (a Greek word that means open place of assembly). Since that moment, the teachers began to call themselves "Unagoreños" or "Unagorautas" showing a further identification with the community.

A detailed report of this meeting is out of the scope of this chapter (the results of the questionnaire are analyzed in chapter 7), however in order to understand the teachers' feelings, attitudes and experiences at that moment, I will briefly present some important issues that the teachers expressed during the meeting:

- The group work was frustrating and discouraged the collaborative work in the pedagogical innovation, however the group work-space allowed them to experiment with the learning environment, creating facilities, making mistakes, and getting rid of the fear of using the Moodle platform.
- They felt overloaded by the formal formation process (readings, learning tasks, and discussion forums), the group work and the design of the pedagogical innovation – all at the same time.
- Among the reasons that hindered a change in teaching practices, the teachers cited lack of time; the comfort zone in which they had been for many years; ignorance and fear of the unknown.
- They asked for more time in their institutional academic workloads to be able to dedicate to activities of professional development. Teachers from the regional campuses have many academic and administrative activities; as well as some of them have field work trips very often.
- Again, the teachers expressed the need for more co-located meetings and more technological training.
- Teachers from some campuses (mainly Coto and Biology Marine Station) complained about their Internet connection and facilities in their workplaces.

- They stated their satisfaction with the learning process, with the provided resources and activities, with the methodology followed through the project and with their newly acquired competences.
- The teachers committed themselves to re-engage, during the holidays, in the activities that they have not accomplished.
- The teachers accepted and seemed to agree on our proposal of applying a more research-based approach to their teaching practice, initiating this process with the pedagogical innovation (a process of formulating a problem and then reflecting, planning, acting, observing, analyzing, documenting, communicating, reflecting – a scholarship of teaching approach).

Some of the thoughts of the teachers are better understood in their own words:

> *[Laura] It is new and difficult to be part of the community. The daily routine absorbs me, however the scarce participation has not deprived me to learn and acquire new skills. ..... We do not have Internet access at home, we have to go to an Internet Café; it is a matter of time and money (First co-located meeting, June 2008).*

> *[Viviana] For two weeks I was uploading documents, sending emails, and creating facilities for the group, and nobody reacted. Some people entered the group but did not accomplished any task requested, so at some point, I took the decision to continue with the community because I want to continue learning, but not with the group because it was rather a distraction. However, in the group work space, I learned the most, as I had a space for trial and error (First co-located meeting, June 2008).*

During the period from June to July, the teachers were introduced to the use of social software in higher education as a complement to the design of the pedagogical intervention. They were invited to create a personal blog (using Blogger) and to collaboratively construct a Wiki. Furthermore, they participated in two topic-oriented discussion forums. The participation level in these activities was lower than the prior level of participation in activities. The first forum was about how to integrate wikis and blogs at university level. Only three teachers contributed to this discussion, they argued that the activities coincide with the end of the semester and this entailed more work for them (for example to grade exams and final projects). The second forum was about online education. In the following, I will briefly describe it.

Forum: Challenges and opportunities of online education

Objective: The aim of this forum was to discuss the challenges and opportunities of online education and reflect on its appropriateness and relevance within the UNA academic context.

Facilitation: For this forum, we invited the Coordinator of UNA-Virtual to share with teachers the institutional experiences within online learning. He addressed various aspects and developed questions to lead to further discussion. Based on this, the teachers constructed the core of the discussion

Participation: This forum generated 14 posts (see Table 6.6). Six teachers participated in the discussion, the expert made 2 postings and the facilitator also participated with 2 interventions.

Teachers participating		Teachers´ posts	Facilitator´s posts	Expert´s posts
Observing and producing	Observing	10	2	2
6	3			

Table 6.6 Participation in discussion forum: challenges and opportunities of online education

Figure 6.7 illustrates the thread of the discussion. The expert opened the discussion with the question: Is the education real or virtual? The question created some confusion and generated a discussion focused on the concepts of real and virtual.

> *[Laura] ..... the [expert]'s question confuses and scares me.... VIRTUALITY OR REALITY?. What a good title for a treaty... Many fundamental issues of educational and pedagogical processes should be referred to real possibilities (Forum: Challenges and opportunities of online education, July 2008).*

> *[Viviana] .....I think that education is real, regardless of the environment in which it takes place, because it is a natural process in humans, which has many definitions but the simplest is the process of knowledge sharing, and that's real, whether we perceive it or not (Forum: Challenges and opportunities of online education, July 2008).*

The participating teachers supported their arguments with references to different philosophers and writers, such as Lacan, Deleuze, Castells, Gisbert and Graham. At the end, they concluded that education is always real. They agreed on the need to move towards alternative

learning environments that satisfy the students' current needs and demands but always prioritizing the pedagogical perspective of the education over the media that delivers it. Even when only few teachers participated in this discussion, there was more discussion among those participating.

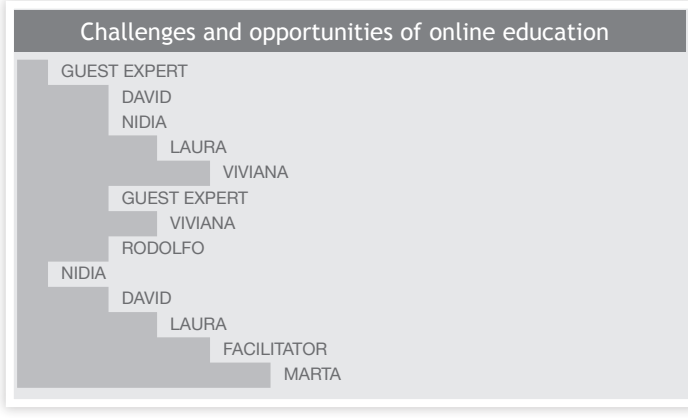


Figure 6.7 Discussion thread: challenges and opportunities of online education

Learning from and for the design

The biggest challenge at that point was to find a balance between online and face-to-face activities. On one hand, we understood the importance of the face-to-face meetings for the participant teachers to feel comfortable and confident in a safe environment. On the other hand, the geographical distance, the required time, and the budget restrictions made it difficult for the facilitator to travel often to each one of the five regional campuses participating in the project. The teachers had not acquired the culture of online participation, they remained highly dependent on the physical presence, and in "the virtual" it was difficult for them to keep the social presence necessary to share and build a community. So, it became clear that it was necessary to find a balance that allowed the teachers to feel comfortable in a blended learning environment. In this perspective, we took the following decisions to:

- Foster teachers, through dialogue and activities, to appreciate the role as a participant in an online learning process, to discover that it is possible to learn and establish productive dialogues through online communication and to see the physical meetings as another opportunity to share experiences and enhance knowledge.

Learning from and for the design

- Be more flexible in matter of time to accomplish the learning tasks.

- Plan and organize a new visit to each regional campus after the holidays of July. This visit was considered important in order to (1) respond to some extent to the teachers' need of face-to-face contact; (2) provide technological support to teachers with difficulties in this area; and (3) give pedagogical feedback on the teachers' innovations.

- Promote small and simple collaborative activities among the teachers. After the challenging experiences with the group work, it was important to renew the teachers' feelings about online collaborative work.

6.4. Experimenting in Classroom: August – September 2008

During the period of August to September, the teachers were focused on the implementation of the pedagogical innovation project. Prior to the implementation, they refined the design with the support of the facilitator and colleagues from the regional campus. Some teachers worked in pairs and others individually and they followed various strategies to implement, evaluate and document the innovation.

In order to provide better support to teachers and to give a personal feedback to their pedagogical project, we programmed a new visit to the regional campuses during August. The facilitator met with the teachers in groups, each teacher presented his/her design and received suggestions and comments to improve the design from their colleagues and from the facilitator. Additionally, the facilitator answered questions regarding the technological platform and on how to use its facilities to support learning goals. Furthermore, in these meeting, the facilitator stressed the importance of group support and encouraged the teachers to share between them their progress and experiences. Once again, we encouraged the teachers to address the innovation with a new professionalism, i.e., a more research-based approach to teaching.

In this period, the role of the groups changed again; the online groups progressed to a second level and new campus-based groups were naturally formed to support the teachers in the implementation process. The teachers looked for their colleagues to share their daily experiences, doubts and successes and they found support from various points of view, the technological, the pedagogical, and the social.

The online activities during this period were oriented towards providing the teachers with experiences in the creation of digital learning material and with spaces for reflection about online and blended learning and assessment strategies for these learning modalities. Among others, the teachers were invited to create an evaluation sheet to be used with their students during the implementation of the pedagogical innovation project; to upload and collaboratively evaluate a typical power-point based-lesson; to create a web-quest as a learning resource, and to work in groups with teachers from the same regional campus in the creation and edition of a video. The teachers also participated in two topic-oriented discussion forums, one about diverse modalities of learning and the other about the design of educational materials. In the following, I will describe the first of them.

Forum: Challenges and limitations of face-to-face, blended and online learning

Objective: The aim of this forum was to promote a dialogue about advantages and disadvantages of different learning modalities.

Facilitation: For moderation of this forum, we invited one of the most active members of the community, who agreed to foster the debate, communication and dialogue about the different modalities of learning. He used several strategies to promote participation, addressing direct questions to different groups of members (including the researchers); using English to invite participating English teachers; using the personal information on the blogs to make a more personal invitation, etc. He introduced three initial questions to make the teachers use their own experiences to reflect on the different learning modalities.

Participation: This forum generated 32 posts in total (see Table 6.7). Five teachers participated in the discussion; five other teachers read the comments; the facilitator made 3 postings and the researchers participated with 5 interventions. The teacher who moderated the forum had a total of 17 comments.

The moderator encouraged an open dialogue and reflection. One teacher introduced the concepts of "digital natives" and "digital immigrants".

> *[Lorena] ...children born in the year 90 and forward can be considered "digital natives" and those born before are "digital immigrants". At least to me, it explains the resistance to this whole new way of learning and teaching. It is not the same being born when things already are there, than to live the transition from the industrial age to the digital age...(Forum: Modalities of learning, July 2008).*

Teachers participating		Teachers´ posts	Facilitator´s posts	Researcher´s posts
Observing and producing	Observing	24	3	5
5	5			

Table 6.7 Participation discussion forum: challenges and limitations

This intervention generated a discussion about the difficulties for teachers to introduce new modalities of learning in classrooms and the institutional conditions to implement blended and online learning. They mentioned factors that contribute to hinder these initiatives in UNA, such as, teachers with temporal and part-time contracts; low salaries; unequal access to technology; the digital gap among students; lack of technological competences; and lack of a digital culture.

> *[Nidia] The virtual environment requires more work and this is perhaps an issue in a campus as [name of the campus] where teachers do not work full time but ¼ or ½ time ...(Forum: Modalities of learning, July 2008).*

One teacher mentioned the students' attitude about using discussion forums.

> *[Rodrigo] .. there is a great enthusiasm but also fear because it is a change in the methodology. I think that, similar to the students who are going to be part of this experience for first time, we are very comfortable in the comfort zone and we do not want to face new challenges ...(Forum: Modalities of learning, July 2008).*

Figure 6.8 shows how the dialogue evolved among the teachers. The efforts made by the moderator to increase participation are noticeable. At the end of the forum, the moderator made a reflection about his experience in the forum. He wrote a summary about the diverse techniques he used to foster participation among teachers and whether they were successful or not.

> *[David] In the forum I was looking for:*
>
> *With the researchers: a commitment to participate (moral obligation). It worked. With English teachers in the community: looking for motivation, I made questions in English to them ... it did not work. With colleagues from the campus: I talked with them personally to motivate participation. It partially worked. Furthermore, I used the information from the blog of some colleagues to approach and motivate them ....I think blogs should play a role. To know the personal aspects of the participants and use them as means to set a stronger personal*

and academic relationship which is critical to the construction of a community. It did not work either (Forum: Modalities of learning, July 2008).

From his reflection, it is possible to read a bit of frustration because the teachers did not respond to his call. However, he said that he was satisfied with the process

[David] Considering the above observations, the forum was a "complete disaster" because almost nothing worked. However, as moderator, I am grateful and peaceful, it is strange isn't it? I shared the techniques that I tried to implement, maybe when you have to be in charge of moderating a forum, you can use them and thus have some ideas on how to cope with the situation ... that is what it is all about, right? (Forum: Modalities of learning, July 2008).

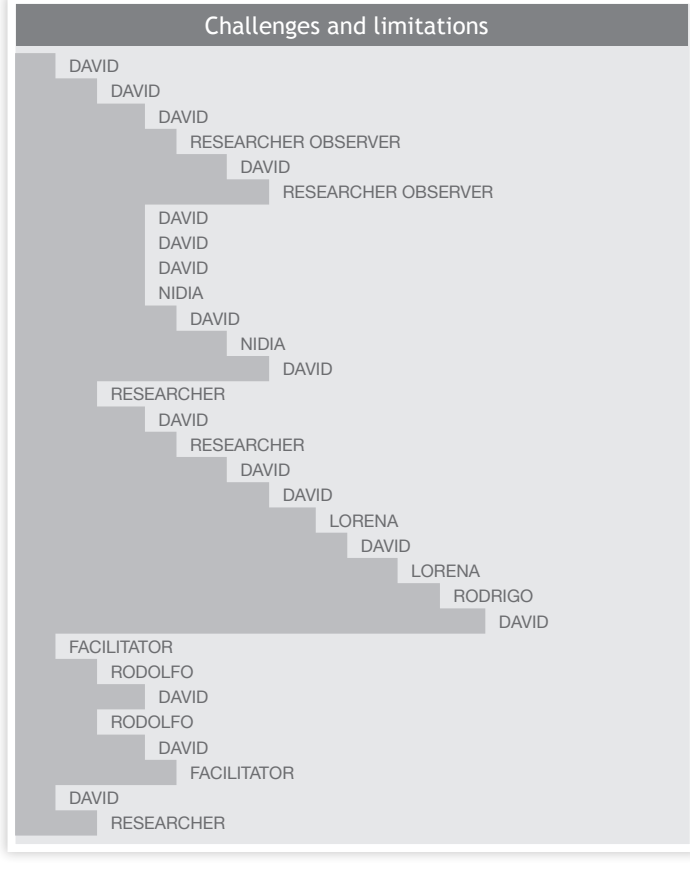


Figure 6.8 Discussion Thread: Challenges and limitations

Learning from and for the design

At this point of the intervention, 17 teachers were participating in the community, and 13 of them were implementing the pedagogical innovation in their classrooms. In this phase of the project, the participation in the online activities had decreased considerably. In explaining this situation, teachers argued many activities and that their priority was to focus on the pedagogical innovation and its evaluation in classroom. Consequently, our focus in this phase was centered on supporting the teachers in this process and in fostering the campus-based group as an element of support and motivation for the teachers' work in classrooms.

6.5. Reflections and the Future of UNAgora: October – November 2008

In this period, the learning objective was centered on reflection. The teachers were documenting the results of their pedagogical interventions in order to share their experience and the experience of their students with the other members of the community. For this purpose, we provided the teachers with guidelines about how to systematize the main aspects of their learning experience.

During the month of October (after 30 weeks from the beginning of the project), four workshops were carried-out by the researcher with four different groups of members of the community. These workshops were the first face-to-face meeting where the main researcher participated together with the participants. The purpose of the workshops was to establish a meaningful dialogue between university teachers and researchers, and they addressed four themes: community formation, learning trajectory, the experiences of the innovation, and designing for a community. This process of mutual reflection enabled a deeper understanding of the teachers' experiences, feelings, achievements and difficulties during their participation in the community UNAgora. In the following, I will briefly describe each of the workshops (Coto & Dirckinck-Holmfeld, 2008) in three dimensions: purpose; facilitation and tools; and teachers' voice.

Workshop#1: Community formation

Purpose:

The purpose of this workshop was to reflect and negotiate with the participants about the concepts and characteristics of communities of practice (Wenger, 1998) and to discover how well or not these concepts were presented in UNAgora.

Facilitation and tools:

Two teachers and two researchers from Marine Biology participated in the workshop. It took place in Puntarenas, 29 weeks after the project start.

We asked the participants to build a metaphor of their experience in UNAgora using Lego bricks. The Lego bricks can embody abstract concepts, thus helping the teachers to concretize elements and meanings that can otherwise be difficult to express and comprehend (Lego Group, 2002). Teachers worked together building diverse components and later on they explained the diverse elements present in their constructions.

Figure 6.9-Workshop "Community formation"- Puntarenas

Teachers' voice:

For the participant teachers in the workshop, the main purpose of the community is to shorten distances, to ease the communication allowing teachers to share experiences, to have more access to information, and to improve their practice,

> *[Mario] Through the experience, we had the opportunity to connect through Internet, but also through phone calls, visits from you at the regional campus, and our own visits at the central campus. In the end, it all gave us the chance to learn and to improve teaching. That is what I think was the purpose of the community, to learn how to do better teaching (Workshop Puntarenas, October 2008).*

In spite of incomplete participation, the teachers said that they felt part of the community and they identified with its goals,

> *[Susan] At some point, I had more contact with the community that with my colleagues here (Workshop Puntarenas, October 2008).*

They expressed suffering from bad consciousness when they did not participate through long periods in the community. Furthermore, they valued the pedagogical and technological competences acquired through the process and acknowledged that the community has made an impact in their motivation to innovate their courses.

The teachers pointed to the working conditions and the teacher culture as one of the factors that hindered the formation of the community. Many of the teachers from regional campuses are employed on a temporary basis. This fact has an impact on their workload, stability and motivation. They stated that their heavy workload did not allow them to make time to increase their participation in the community even when they had enough motivation to participate. They felt that working in a regional campus were more absorbing than working in the central campus.

> *[Susan] Being here is very time consuming, it is not the same as in the central campus (Workshop Puntarenas, October 2008).*

Generally, the culture of the teachers is deemed very individualistic. Their tasks at the university are usually an individual responsibility, thus they are not used to working together.

> *[Susan] We understand each other but we do not share (Workshop Puntarenas, October 2008).*

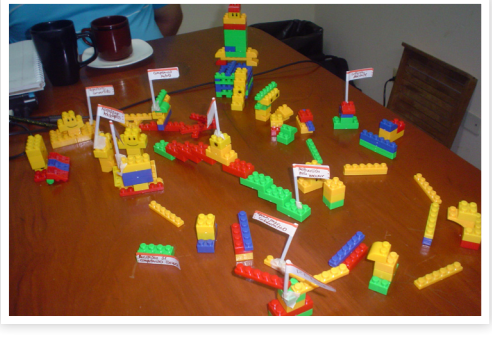


Figure 6.10-Workshop "Community formation"- Puntarenas UNAgora's metaphor

In their perspective, their teacher culture is not, to some extent, compatible with the community concept, so it is necessary to change the culture if they want to learn in a community learning environment. As an example, they mentioned their workplace conditions.

> *[Mario] Our workplaces are isolated, and we do not talk. We*

do not use radio; the work space is always silent (Workshop Puntarenas, October 2008).

Another issue that was highlighted is the institutional support. The rest of the university community needs to know about UNAgora and its purpose,

[Susan] those involved understand the importance of the community but those outside do not. There has been lack of disclosure to other people ... what does it mean? What it is? (Workshop Puntarenas, October 2008).

They stressed the need for their participation in the community being taken seriously by the other colleagues of the regional campus and by the administration. According to them, activities such as chatting are seen by other teachers as a waste of time,

[Mario] participating in a chat is seen by others as if you were loafing (Workshop Puntarenas, October 2008).

Regarding levels of participation in the community, they mentioned four limitations: (1) The very active participation of one teacher and his comments about no participation hindered the overall participation; (2) This situation generated doubts and concerns about what kind of participation was expected within the community; (3) The high levels of diversity in fields of expertise made it difficult to communicate; (4) The literature about pedagogy is complex and difficult to understand for teachers that belong to technical or engineering areas.

Workshop #2: Learning trajectory

Purpose:

Our goal in this workshop was to discuss with the teachers their learning trajectory in UNAgora and its influence in their teacher identity.

Facilitation and tools:

Three teachers and two researchers participated in this workshop. It took place at UNA Campus in Liberia, 29 weeks after the project beginning. As an initial motivation and source of inspiration, we started the workshop listening to a short story. Then, we asked the teachers to make a drawing which represented their learning trajectory in the community. They used different materials (papers, pencils, stickers and picture cards). The teachers worked individually during this process and later on they shared their stories with the rest of participants.

Teachers' voice:

Figure 6.11-Workshop Learning Trajectory- Liberia

Retelling his learning trajectory, one of the teachers said

> *[Pablo] Everything always starts with the first step. On your path you can find many means to help you reach the goal. Some means are better than others, and you can always find obstacles that might be mentally, physically or infrastructural related. However these obstacles or padlocks always come with a key, the important thing is to find which key opens these locks. Sometimes it appears that even if you have the key and the right padlock, there are other circumstances that can stop you, but you should not run away from the difficult situations, you should keep trying (Workshop Liberia, October 2008).*

Figure 6.12-Workshop "Learning trajectory"- Liberia: A personal story

The story talks about goals, obstacles and options. The teachers' goal is to change the traditional teaching model, and the community is a means to achieve it. However, the path to achieve the goal is not free of obstacles. Among these obstacles, the teachers mentioned workload, internet access and technological competences. Many teachers are part time and in addition some of the teachers in the regional campuses have several other tasks. They do not have time to participate in meetings or activities, so they also do not have time to change.

> *[Rodolfo] It is easier to keep on doing the same as always (Workshop Liberia, October 2008).*

Not every teacher has Internet access at home, so participating in the community entails spending more time at the university. In addition, they do not have the adequate technological competences to deal with the learning platform,

> *[Rodolfo] Teachers are not exposed to technology; they do not have contact with it. Some of them do not even know how to use a laptop (Workshop Liberia, October 2008).*

In this respect, they stressed the need of more initial training in the use of tools.

> *[Pablo] You need to feel confident with the learning platform in order to participate (Workshop Liberia, October 2008).*

They also mentioned the online group work as one of the most difficult tasks. For them, the richer part of sharing had been developed among the colleagues from the same regional campus.

Nevertheless, the teachers feel the need to change, and in this perspective they valued the experience within the community, their new knowledge about new tools, their empowerment to change their practice, the opportunity of sharing with others and the opportunity to design an innovation in their classrooms,

> *[Pablo] If I had not been satisfied with the experience and learned the educational potential of the tools, I would not have implemented it with my students (Workshop Liberia, October 2008).*

Furthermore, they were happy that UNA had considered the regional campuses as the target groups of the project.

> *[Elisa] The regional campuses are rarely taken into account in these kinds of projects (Workshop Liberia, October 2008).*

And despite of the difficulties, they valued the relationships with other colleagues.

> *[Rodolfo] On few occasion, we had the opportunity to share ideas*

> *and knowledge with the other regional campuses (Workshop Liberia, October 2008).*

Many of the activities of the community were online. When we asked the teachers to reflect about their own levels of participation in the online activities, one of the teachers expressed:

> *[Elisa] Why does David have the time to participate in all the activities and I do not? When I compared my possible contribution with David's contribution, I felt that I did not have the same level ...so I gave up my intention to write something (Workshop Liberia, October 2008).*

This feeling was consistent with the concerns expressed by the teachers that participated in the workshop #1.

Workshop #3: Experiences about the innovation

Purpose:

The aim of this workshop was to explore together with the teachers their experiences, as well as their students' responses, during the implementation of the pedagogical innovation.

Facilitation and tools:

Six teachers and two researchers participated in this workshop. It took place at UNA Campus in Nicoya after 29 weeks, duration of the project. The workshop consisted of two activities. First, each teacher designed a pair of glasses that represented their different perspectives of understanding their innovation process. This activity allowed us to understand how each teacher sees the innovation and its teaching practice through different eyes and perspectives. As second activity, they were asked to explain their experience through drawings using the following questions as a guide: What do I want to change? What am I doing? What impact has it had for me as teacher? What are the students' responses? And, what would I like to continue doing? The teachers worked through the activity and then they shared their experiences with the rest of participants.

Teachers' voice:

The purpose of the pedagogical intervention was to provide the teachers with the opportunity to take risks, to do something new in their practice, and to address this innovation through a more professional way of teaching (meaning a process of reflection, planning, acting, observing, analyzing, and documenting and communicating).

Figure 6.13-Workshop "Innovation experiences"- Nicoya

In the campus where this workshop took place, the teachers focused the innovation on the introduction of ICT tools rather than on the POPP approach. The teachers have diverse aims for introducing technology in their practice:

- ICT is a means to structure and arrange the courses:

[Rodrigo] My course is very theoretical; my goal was to improve the participation of students through the forums and begin to change their vision of the education (Workshop Nicoya, October 2008).

- ICT as a means to change the classroom dynamic:

[Lorena] All professors have been experiencing problems with this group of students. They are good students but the group work is very conflictive. What I wanted to change were the communication patterns they had. My first challenge was to provide them with a space in which they could talk in a respectful and collaborative way. ..... My big smile is because they have found another way of relating through the forum (Workshop Nicoya, October 2008).

- To discuss topics not considered in the formal contents of the course:

[Javier] In the forums, I was able to discuss topics that are not directly related with the topics of the course but which - like plagiarism - are important for the students (Workshop Nicoya, October 2008).

- As an extension of the classroom:

[Silvia] I used forums to allow for a broader participation, and to organize activities that are parallel to the course but normally difficult to find the time for in the classroom. We participated in the forum and then took up the discussed topics again in the

classroom and reflected about the process (Workshop Nicoya, October 2008).

Figure 6.14-Workshop "Innovation experiences'- Nicoya: A personal experience

In one of the first forums in the community, some teachers expressed a concern about the students' possible negative reaction to the introduction of changes in the teaching process due to their traditional culture of learning. After the pedagogical innovation, we asked the teachers again to express their current opinion. All teachers in the workshop acknowledged the students' very positive response.

[Silvia] They are very motivated. I have told them that in the future we are going to use chats, blogs and wikis and they are very excited about it (Workshop Nicoya, October 2008).

Some students already have some experience with the use of the learning platform, but for the majority it was something completely new.

[Rodrigo] At the beginning, the students felt anxious, they did not know how to use the learning system, but most of them could overcome this feeling after the first interaction (Workshop Nicoya, October 2008).

In the same respect, another teacher said

[Lorena] At the beginning, they [the students] were very afraid of using technology. But now they feel very proud of themselves and they have obtained a special appreciation from the other groups (Workshop Nicoya, October 2008).

The use of online communication has been a way for timid students to increase their participation. In this respect, one of the teachers commented

[Lorena] The first student who participated in the first forum was

> *a girl that I have not heard too much from in the last 4 years. I noticed a positive change in her participation and in the response to her fellow students (Workshop Nicoya, October 2008).*

Generally, the teachers reported that the students were very enthusiastic and were talking about this experience in all their classes. This caused the other teachers on the campus to begin to show interest in the innovation and in the community.

One of the goals of the project was to empower the teachers in their teaching practice and in their role as teachers. In this respect, the teachers acknowledge their new competences and perspectives as three of them proudly commented:

> *[Silvia] I made the introduction of the learning platform to my students by myself!!! (Workshop Nicoya, October 2008).*

> *[Rodrigo] I am very pleased with the effort I'm making to improve my teaching quality. I know that I cannot return to my old teaching way. I realized that I can continue improving (Workshop Nicoya, October 2008).*

> *[Luis] Today, I say to myself, if I do not make changes it is only because I do not want to (Workshop Nicoya, October 2008).*

Even though they only made the first step in their way to innovate practice, they commented that the process was not an easy one. The element of time was a major barrier for their active participation in the online activities,

> *[Lorena] Since the first moment, I was very excited about the innovation, but I was lagging behind. Due to the planned schedule, I could never enter a chat, so I felt lost; I did not know where to start (Workshop Nicoya, October 2008).*

In this regional campus, the teachers had organized themselves very well as a supporting group during the implementation of the pedagogical innovation. They interacted often, sharing their concerns and expectations, and supporting each other in the process,

> *[Rodolfo] I did not feel very safe using technology, so I looked for support from my colleagues. They gave me great support and this helped me to continue with the innovation (Workshop Nicoya, October 2008).*

However, after July and before initiating the pedagogical innovation, they were afraid of their technological skills, thus four of them took the decision to travel weekly to Heredia to receive the Educational Innovation course in a face-to-face modality

> *[Nora] I was clear that I wanted to innovate my teaching practice, but I am not skilled with technology, so at the beginning,*

> *it was very frustrating for me. I could not do it by myself; so I made the decision to go to Heredia and now I am progressing in my innovation and now I am more prepared and motivated to be part of the community in an effective way (Workshop Nicoya, October 2008).*

This shared decision, their commitment to change their practices, and the hours that they spent together traveling back and forth to Heredia, have created a strong tie among this group of teachers. They are optimistic about the future of the regional campus. They consider themselves as pioneers, as agents of change within their campus and are willing to share their experiences and expectations with other teachers and invite them to participate in the community. In this perspective, one of the teachers commented,

> *[Silvia] I created a lot of expectations among students and teachers and that is the most important achievement of the process (Workshop Nicoya, October 2008).*

Workshop #4: Designing for a community

Purpose:

The main purpose of the workshop was to evaluate the design of UNAgora through the eyes of the teachers. With this exercise, we aimed to empower the teachers to self-design the second cycle of UNAgora, and at the same time reflect on their own experience as members of the community.

Facilitation and tools:

Three teachers and one researcher participated in this workshop. It took place at UNA Campus in Perez Zeledon (PZ), 30 weeks after the project take-off. We asked the teachers to consider themselves as educational designers and use their experience from ten months as members of UNAgora to design a community for the Sede Brunca. This campus is constituted by two sub-campuses with 200 km of distance between them. In the design, they might consider: purpose of the community, teacher's culture, roles, structures of participation (tasks, spaces and organization), social relationships, collaborative work, the learning agenda, and the technological platform.

Teachers' voice:

The first aspect that became clear with the exercise in this workshop was that not all teachers had a clear sense of the purpose of the project. For some of them, the aim of the project was to teach about

Figure 6.15-Workshop "Designing for a community"- Pérez Zeledón

Moodle, UNA virtual classroom and its facilities and, as such, some of the designed activities within the community which did not make full sense for them.

> *[Laura] If we had seen [the project] in this way from the beginning, perhaps things would have been different (Workshop PZ, October 2008).*

In order to illustrate how the teachers conceptualized the design for a community that supports change of teaching practices, I will briefly sketch the aspects analyzed.

Purpose: In this part of the discussion, the teachers decided that besides the development of competences, they aimed to create a community of teachers who shared ideas and concerns.

> *[David] If we make the analysis of access to technology and the culture of teachers, what purpose could be more successful? Are we aiming at an effort to generate an approach to new technologies and techniques, or to create a virtual community on a specific area? (Workshop PZ, October 2008).*

Target group: The teachers struggled in deciding whether there should be a selection process or not based on technological skills or digital culture (in order to facilitate participation). Another issue analyzed by them was the level of engagement in the university as, for them, teachers employed full time at the university, would show more identification and more belonging with the community, but the problem was that most of the teachers in the campus are employed part time and on temporal contracts. The mix of several disciplines was another element, while some teachers defended the richness of having teachers from several areas of expertise, one of them commented:

> *[David] It has been one of my criticisms of UNAgora that having many people with different areas of expertise generated - to*

some extent - a limitation to the discussions within the specific language of an area of knowledge (Workshop PZ, October 2008).

The conclusion after the discussion was that the requirements for participation should be availability of time, open-mindedness, willingness, motivation and commitment.

Teacher culture:

[Tom] Do teachers like to participate in face-to-face meetings? Are teachers supportive people? Are teachers interested in institutional projects? Do teachers have a participatory culture? Are teachers willing to share experiences and knowledge with others? (Workshop PZ, October 2008).

These were questions (with no answers) that the teachers broadly discussed.

Participation: What motivates teachers to participate? What are the aspects that limit their participation? These were questions that the teachers discussed to finally conclude that the major problem is a matter of culture or habits. One of the teachers expressed:

[Laura] I came to the conclusion that the Internet access is not the problem, it is more a matter of habit and time. As university teachers and - being honest - we have possibilities, we have time available but we do not have a habit of participating in an online community or of sharing with others (Workshop PZ, October 2008).

Learning process:

[David] In UNAgora, we started out with high expectations of participation and then we narrowed down these expectations, and we should rather do the opposite: start with small expectations, something simple for people to get involved and end up with higher expectations (Workshop PZ, October 2008).

Based on this experience, and the aim to help the teachers to make pedagogical innovations using the virtual classroom and other tools, the participants in the workshop designed a process with two phases: the first one with strong face-to-face scaffolding that would enable the teachers to learn the communication tools and the online platform and feel confident with its use. In the second phase, the teachers would decide within a blended process what are the common interests and what they would like to discuss? The duration of the process was defined to last 6 to 12 months.

Roles: The teachers proposed a hierarchy structure with UNA Virtual on the top and then themselves as facilitators and then the

regular participants.

> *[David] First UNA-Virtual because its generated experience, the technological platform and the ability to offer professional support. In second place would be us: we have already participated and generated experience in UNAgora, thus we can give face-to-face support to other campus teachers, and we will be the facilitators (Workshop PZ, October 2008).*

> *[Tom] And, in third place the participants as they could be type 1 and type 2, with some characteristics to identify and support them in a better way (Workshop PZ, October 2008).*

Institutional support: The teachers stated the institutional support as a fundamental element to ensure the success of the project.

> *[David] If the community is going to grow, it needs to be supported by the dean and the administration. A strong institutional support facilitates the process; people become part of the community without fear because it is an institutional project with resources, facilities and support. This creates a better environment to succeed in the community (Workshop PZ, October 2008).*

They also stressed the importance of a divulgation process, and proposed that the teachers should receive a certification for their participation.

Motivation: The teachers were discussing how to motivate people to feel part of the community. According to their experience in UNAgora, they argued that social activities must be taken into account to cultivate a sense of belonging, for example they mention, to have a lunch together, to get to know each other, to take pictures, and so on. Another factor of motivation is the feeling of contributing in some way.

> *[David] That is the greatest feeling I have, as a personal reflection, that you made a contribution and somebody benefited from it, or your contribution opened a new idea or created new interest. For me it is essential to see the result of my contribution (Workshop PZ, October 2008).*

Infrastructure: Teachers considered that the Brunca regional campus has a good technological infrastructure and a good technical support. They have three lab computers, wireless and most of the teachers have laptops and internet access in their homes. In this respect, the teachers did not see major difficulties in establishing a networked learning community.

This workshop and the discussion of the above commented issues opened an important dialogue among teachers and researcher with relation to developing a growing and sustainable strategy for the

Figure 6.16-Workshop "Designing for a community"- Pérez Zeledón: A new design

community. The strategy for the sustainability of UNAgora was an important topic to discuss in the last co-located meeting.

In the beginning of November, the last co-located meeting took place. In this meeting, 15 teachers participated, ten of them in the central campus of Heredia and the other five by videoconference. Table

Campus	Number of participants	Modality of participation
Puntarenas	2	face-to-face
Liberia	3	face-to-face
Nicoya	5	videoconference
Pérez Zeledón	4	face-to-face
Coto	1	face-to-face

Table 6.8 Participation in the last co-located meeting. November 2008

6.8 shows the distribution of the participants.

The meeting took place after 32 weeks after the project beginning. The main purpose was to share with the teachers the pedagogical innovation projects. However, we also wanted to work with the teachers in order to develop a strategy for the future of the community and to make a final evaluation of the entire intervention. Regarding the pedagogical innovation, the teachers made a presentation of their design and results during the meeting. The face-to-face presentation of the innovation was complemented with a discussion forum in the second week of November. In the forum, ten teachers participated. In both spaces (the co-located meeting and the online forum), the teachers shared difficulties and successes. In the following, a summary of the teachers' conclusions regarding four aspects is presented: The personal

impact on the teachers of the pedagogical innovation; the response of the students to the innovation; their future teaching practice and their requirements for keeping innovating.

- What impact does the pedagogical innovation have for me as a teacher? In answering this question, the teachers mentioned issues such as personal growth; overcoming fears and technological limitations; enhancing of pedagogy; keeping up-to-date; self-learning; breaking paradigms; new challenges; better motivation towards practice, motivation towards professional development initiatives; lifelong learning; teacher as facilitator; bringing new forms of teaching and learning; and collaborative learning.
- What is the response from students? All teachers were very positive about the students' responses. They reported the following benefits: increased level of participation; increased ability to discuss and to state critical opinions on topics; increased motivation in their engagement and commitment in classroom; losing the fear to use technology; self-learning; better conditions of time and space for learning; and collaborative as well as more dynamic learning. In general, the students were very satisfied and expressed the desire to have other course approaches like the experienced. However, they also required better access to technology. In some of the campuses, the computer labs had very restricted schedules of availability and it affected the students' engagement.
- What I would like to continue doing? The change of teaching practices needs to be an ongoing process. As the teachers had commented in different forums, it needs to continue and improve day by day. In this perspective, we asked the teachers to reflect upon their future expectations, and some of their responses included: using technology resources in more courses; seeking new ways to innovate; learning and experimenting with new pedagogical approaches; receiving additional training on the tools offered by the UNA virtual-classroom; developing integrated projects within the regional communities and with student participation; maintaining active communication with members of UNAgora; collaborating actively in UNAgora; participating in virtual learning communities both

nationally and internationally; facing new challenges and being better prepared to motivate and support other teachers who begin the innovation process.

- What do I need for continuing the innovation of my practice? In addition to knowing the future expectations of the teachers regarding their teaching practice, it was important to consider what they require in order to keep taking risks and trying to change the old paradigm of education at UNA. In this respect, the teachers commented: having an open mind to change; being confident in myself; having good health and being alive; better organization of time; being able to face new challenges; being willing to take risks; continuing the training process; being part of UNAgora; having the support of colleagues from the regional campus; learning new tools; institutional support; participating in national and international academic activities; and learning more about my discipline.

In this list it is interesting to note that an important part of the mentioned issues are internal to teachers, thus to some extent, the teachers recognize that the possibilities to change begin on their attitude. The design, implementation, evaluation and communication of the pedagogical innovation constitute a reification of their learning process. This learning process not only changed teachers' practice but also contributed to shaping their identities,

> *[Laura] I am no longer the same as when I started in the community (Co-located meeting, November 2008)*

Another main activity in this meeting was related to the design of a strategy for the future of UNAgora. The teachers worked in groups using a template that we developed from Etienne Wenger. The Appendix K shows the main ideas and expectations of teachers regarding the three fundamental dimensions of a community of practice. As a complement of this activity and in order to begin and continue the dialogue about the future of UNAgora, a discussion forum was opened a week before the face-to-face meeting.

Forum: The future of the community

Objective: The aim of this forum was to collectively develop a strategy that allowed the growth and sustainability of UNAgora.

Facilitation: This forum was moderated by the researchers, who propose two elements to start the discussion: (1) The integration of newcomers: How to ensure the community as a place to receive

new members?; Who should be new members?; What should be the role of old members?; Who will assume the leadership of the community?; (2) The learning agenda: As a community, we need to move further, so which kind of activities do we need? What kind of expertise do we want? How do we make our learning agenda compatible with the needs and interests of the new members?

Participation: The number of teachers that read and posted messages in this forum were 12, and one more teacher visited the forum but did not produce any post. In total, there were 29 postings where the teachers contributed with a total of 20, the researchers made 7 postings and the facilitator participated with 2 interventions (see Table 6.9).

Teachers participating		Teachers´ posts	Facilitator´s posts	Researcher´s posts
Observing and producing	Observing	20	2	7
12	1			

Table 6.9: Participation discussion forum: the future of UNAgora

The contributions within the forum were very rich. The teachers reflected on their learning process through the community and then suggested lines of development for UNAgora. Two of these reflections are:

> *[Nidia] Since we started this online community, my involvement has been a pleasure and a challenge. Working with advanced technology in isolated rural communities is hard, difficult and often frustrating. However, precisely because we are isolated, being part of this community has brought me into contact with new initiatives for education (Forum: Future of UNAgora, October 2008).*

[Viviana] In the beginning it was difficult to learn this new form of socialization and community involvement. We learned a lot, and there was much work, but I think the biggest challenge was to implement the innovation..... It was a rich experience of learning where we put our learning into practice with the implementation of an innovation lead by ourselves. This experience prompts me to enter into a master program and it certifies, to some extent, how important these educational experiences are for teachers to renovate themselves (Forum: Future of UNAgora, October 2008).

One of the most important outcomes of the project can be seen in

the new role that the teachers acquired as change agents in their regional campuses. In this perspective, two teachers commented:

[Silvia] The fact that our colleagues observed us planning lessons in a different way and saw that my students, their students as well, were always awaiting what was new ...had promoted curiosity and allowed them to think about the need to grow and produce new forms of learning in means such as the community. I think now that we must all assume the leadership,.... we must be communicators of the process and urge our colleagues to get involved in this process (Forum: Future of UNAgora, October 2008).

[Lorena] Regarding the future of the community, I feel that we are the pioneers and we must assume a leadership role in our regional centers. The simple fact of having seen us works differently, makes colleagues want to be part of this new form of learning and teaching (Forum: Future of UNAgora, October 2008).

In the forum, the teachers suggested diverse strategies for the future of UNAgora, this topic is analyzed in the last chapter. However, some of the issues addressed by the teachers were: (1) institutionalization, (2) self-design, (3) monitoring, (4) expertise, (5) training, and (6) collaborative projects.

In the dialogue, the teachers acknowledged the value of the community and how it impacted on their expectations about learning.

[Mario] It is interesting how expectations can be dynamic. Initially, the community was seen as a comprehensive course for training in the preparation of distance learning courses ..... But over time, it was clear that it was not just learning computer skills for innovation but also acquiring pedagogical aspects together with an interesting way of learning, where it was possible not only to learn from experts in the themes but also from colleagues with an invaluable domain expertise. Undoubtedly, a community with a shared vision generates growth in each of us of a more complex nature than when we strive to acquire knowledge individually. The strategies employed in the community for the enrichment of each member gave an intrinsic value to knowledge (Forum: Future of UNAgora, October 2008).

Figure 6.17 shows the thread of the discussion. The participation in this forum was the highest in the last four months. It could be related to two elements: First, the participation was based on own experience, so the teachers did not need to read or prepare prior to their participation. Second, the teachers were interested in continuing being members of the community and had a desire to influence and improve a future design of it.

Figure 6.17 Discussion Thread: The future of UNAgora

Learning from and for the design

The last part of the intervention was focused on reflection. An initial feature of the design was the reflection blogs. With the personal blog, we aimed at providing an ability to trace their learning through the entire process. However, the teachers were not willing to use the blogs often. The process of reflection about the teachers' learning process took place mainly in the co-located meetings and in some of the discussion forums that can be considered meta-reflection spaces.

The pedagogical innovations designed and implemented by the teachers showed a strong tendency to include technological tools rather than to change the pedagogical approach, for example using the POPP approach. For teachers that are giving their first steps in the process of changing their practice, it appears as hard work to focus both on community and ICT and POPP. A future design needs to put more effort into offering the teachers more preparation and support in how to combine ICT with new pedagogical approaches, as well as time to learn how to be a productive member of a community of practice.

Summary

Through this chapter, I aimed to tell a story that allows the readers to understand how the design developed in chapter five was enacted by the teachers participating in the study. In a sense, it is a live story, telling of experiences as they happened in real time.

The form of the story corresponds to the methodology that inspired this study. According to design-based researchers (Barab, Baek, Schatz, Scheckler, & Moore, 2008; Gravemeijer & Cobb, 2006; Hoadley, 2002) it is necessary to include information about the context of the action, the intentions and meanings that drive the action and its subsequent evolution in order to provide a rich account of the design and its evolution.

The quotations and stories showed the richness, the diversity and the wide variation of behaviors that can be observed in a distributed community of practice approach to university teachers' professional development.

Looking back on the experiences reported in this chapter is clear that the implementation of a distributed community of practice approach in practice has proven to be challenging. The difficulties in retaining teachers through various activities and in obtaining the level of participation and sharing expected by the designers are evident.

In general, participation in the different activities started very positively, but then began to struggle, and it slow down dramatically, at critical times such as the examinations week or the semester term.

The iterative process of refinement helped to improve and refine the activities. In particular, working with small sub-communities in a face to face mode has had a positive impact on teachers' motivation to continue in the community. On the other hand, issues such as extending the deadline and the aspects of flexibility in the activities seem to just have a little relative positive impact on some teachers.

The process of reflection at the end of the intervention showed that the most difficult for teachers in completing the activities revolved around the question of time. The initial schedule of one to two weeks proved to be unrealistic in most cases. It became clear that to achieve higher levels of participation and commitment, a much longer period was necessary. The pedagogical innovation activity, by its nature, was quite flexible in terms of time and was the most satisfying for teachers and for the purposes of the professional development process.

The reported quotations illustrate some of the ideas and emotions experienced by teachers. They also highlighted important issues to be discussed in the next chapter, for example, their motivations and barriers to participating in activities.

Chapter 7

Presentation of Findings

The only way to make sense out of change is to plunge into it, move with it, and join the dance.

Allan Watts

Presentation of Findings

The purpose of this study is to explore the potential use of a community of practice as a framework to improve the pedagogical and technical competences of university teachers. The study has used a design-based research methodology to co-develop a community of practice and has examined the experiences of the participating university teachers. This methodology allowed the iterative evaluation and updating of the design of the community in reaction to the feedback and responses of the academics. Data was created using observations, interviews, workshops, and questionnaires. The data gathered through those techniques was analyzed through a recursive process to generate codes.

Through the process of answering the research questions - coding, collecting, grouping and organizing the data - several codes emerged that were grouped into networks or theme groups: 1) benefits of participating in the community, 2) factors that motivate academics to participate in the community and 3) factors that restricts participation in the community.

This chapter is divided into five sections: The first section provides a summary of the participation in UNAgora, and the second examines how the academics perceive their identity in and commitment to the community. The results presented in both sections help to contextualize and better understand the three themes that emerged in the analysis and which are discussed in sections 7.3 to 7.5. Each theme captures those experiences, observations, and perspectives that proved to be the most salient and common among the participating academics. All the information presented in this chapter should be viewed as a complement to the "story" told in the previous chapter. In the next chapter, I will discuss the findings linked to the research questions.

7.1 Participation in the Community

The professional development model proposed in this study comprises several frames or modes of engagement for university teachers. These modes include, broadly speaking, (1) online activities (chat, discussion forums, reflection forums, group work), (2) co-located activities (meetings, workshops) and (3) the design, implementation and evaluation of a pedagogical innovation. Table 7.1 offers information about the participation of the academics who were members of the community for more than three months. Understanding the level of participation of each academic in the community should give weight to

the interpretation of the comments in the subsequent sections.

Academic	Face-to-face meetings (A)	Participation in online discussion forums			Design, implementation and evaluation of the pedagogical innovation (E)
		Active participation (B)	Passive participation (C)	Global participation (D)	
Laura	83%	50%	17%	67%	yes
Luis	100%	0%	25%	25%	yes
Rodolfo	67%	50%	8%	58%	yes
Rodrigo	100%	25%	0%	25%	yes
Eduardo	33%	17%	17%	33%	no
Elisa	100%	25%	25%	50%	yes
Mario	100%	50%	17%	67%	yes
David	100%	100%	0%	100%	yes
Rosa	67%	42%	17%	58%	yes
Susan	100%	33%	25%	58%	yes
Viviana	50%	75%	17%	92%	yes
Lorena	83%	50%	8%	58%	yes
Tom	100%	33%	42%	75%	no
Javier	67%	58%	33%	92%	yes
Marta	83%	50%	42%	92%	no
Nidia	50%	83%	0%	83%	yes
Lucas	33%	25%	0%	25%	no
Allan	33%	25%	17%	42%	no
Nora	67%	0%	17%	17%	no
Alberto	17%	17%	17%	33%	no
Pablo	100%	33%	8%	42%	yes
Silvia	100%	50%	0%	50%	yes

Table 7.1 Percentages of global participation of academics in the community

Table 7.1 shows each teacher's percentage of participation in each kind of activity. Column (A) refers to the participation in the face-to-face-activities. Generally, a high level of participation can be noticed in these meetings. Columns B, C and D refer to online participation (mainly discussion forums). Column (B) deals with active participation, meaning that the teacher wrote at least one contribution in the forum, column (C)

shows passive participation, meaning that the teacher only visited the forum (and likely read the discussion). The percentages are calculated considering the number of discussion forums (12 in total), and the number of forums in which the teacher participated (independently of the number of postings that she/he wrote in that forum). For example, Laura had an active participation in six discussion forums (6/12=50%), and a passive participation in two (2/12= 17%). Column (D) reflects the global, online participation (active + passive), in the case of Laura 67%. Column (E) shows whether the teachers implemented in their classrooms what they learned.

Participation in online activities

Participation in online activities comprises participation in chats, blog reflection, discussion forums, and group work.

Chat conversations: 21 teachers participated over time in 23 chat sessions. There were an average of five participants in each session, with a maximum number of participants of 14 and a minimum of 2. The synchronous nature of the chat allowed direct interaction with everyone in the virtual room and the social space that was recreated were extremely valuable to the formation of a community identity. During the chat sessions, various topics arose; however, by the very nature of the interaction and the constant in and out of the people in the chat room, along with some technical difficulties with the connection, it was difficult to follow up on the ideas and depth of the issues.

Blog reflection: The blog was conceived as a space of personal reflection on the learning process, as such its value as an activity is very high, both from the viewpoint of the learning experience at individual and community level. The personal blog was aimed at providing an ability to trace the individual learning through the entire process. However, the teachers were rarely willing to use the blogs. An average of eight teachers wrote a reflection on the blog at six different times during the study. The entry of the blog with more participants (22) was regarding a personal presentation, and the entry with fewer participants (1) referred to blended learning. The process of reflection about the teachers' learning process mainly took place in the co-located meetings and in some of the discussion forums that can be considered meta-reflection spaces.

Discussion forums: There were a total of twelve discussion forums. By nature, four of them were considered reflection forums (Expectations about the learning experience; My participation in the community; The future of UNAgora; and Sharing lessons learned), and the remaining eight targeted a specific subject domain (POPP; Internet

and Education; Project-based learning; UNA pedagogical model; Wikis and blogs at university level; Challenges and opportunities of online education; Modalities of learning: challenges and limitations; and Design of educational materials). The twelve forums were distributed from March to November 2008, and each one lasted between one and two weeks.

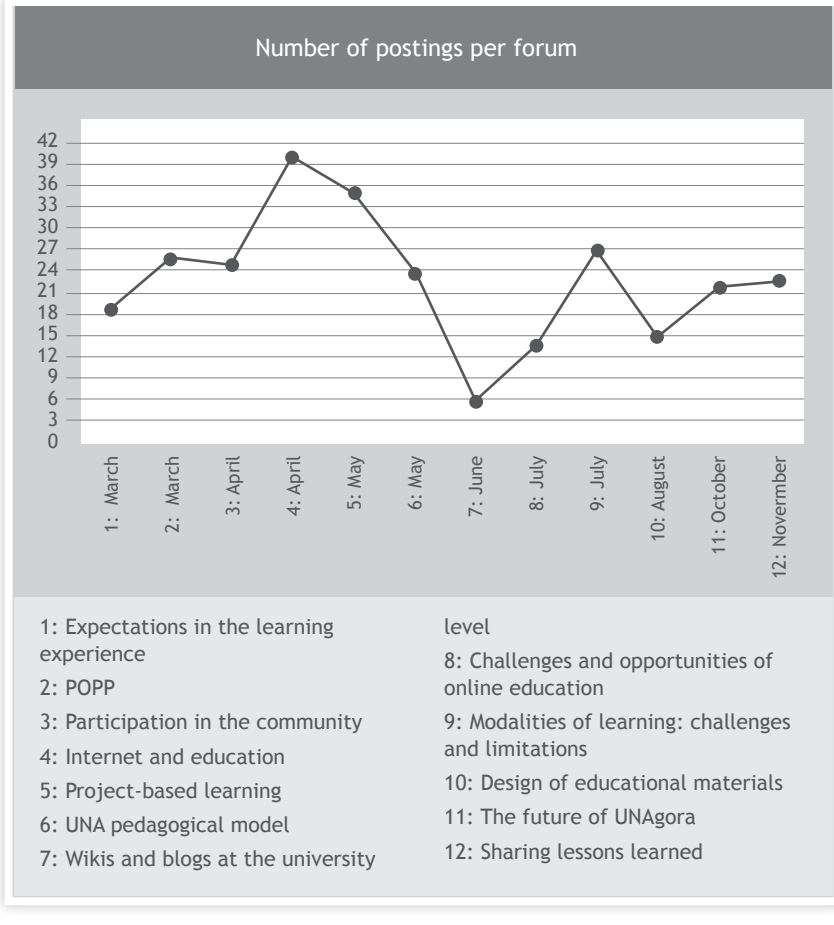


Figure 7.1 Number of postings per forum: March- November 2008

Figure 7.1 shows the number of postings in each of the discussion forums. As it can be seen, the "global" community participation was very irregular; it had a tendency to increase from March to April, and then started to decrease until June where it was at its lowest. Participation started again to increase in July and decrease in August, just to increase

again in October. The lower levels of participation were from June to August. It can be associated with various factors: (1) in June-July, the teachers were on institutional holidays, (2) the topics were not interesting for them; and/or (3) in July-September, they were focused on implementing and evaluating the pedagogical innovation in classroom. An increase can be seen in the forum #9, "Modalities of learning", but this number is inflated by the participation of the facilitator (in this case one of the teacher members of UNAgora).

Figure 7.2 shows the participation of academics in each of the discussion forums that were part of the intervention. This figure separately considers the "active" participation, meaning producing a

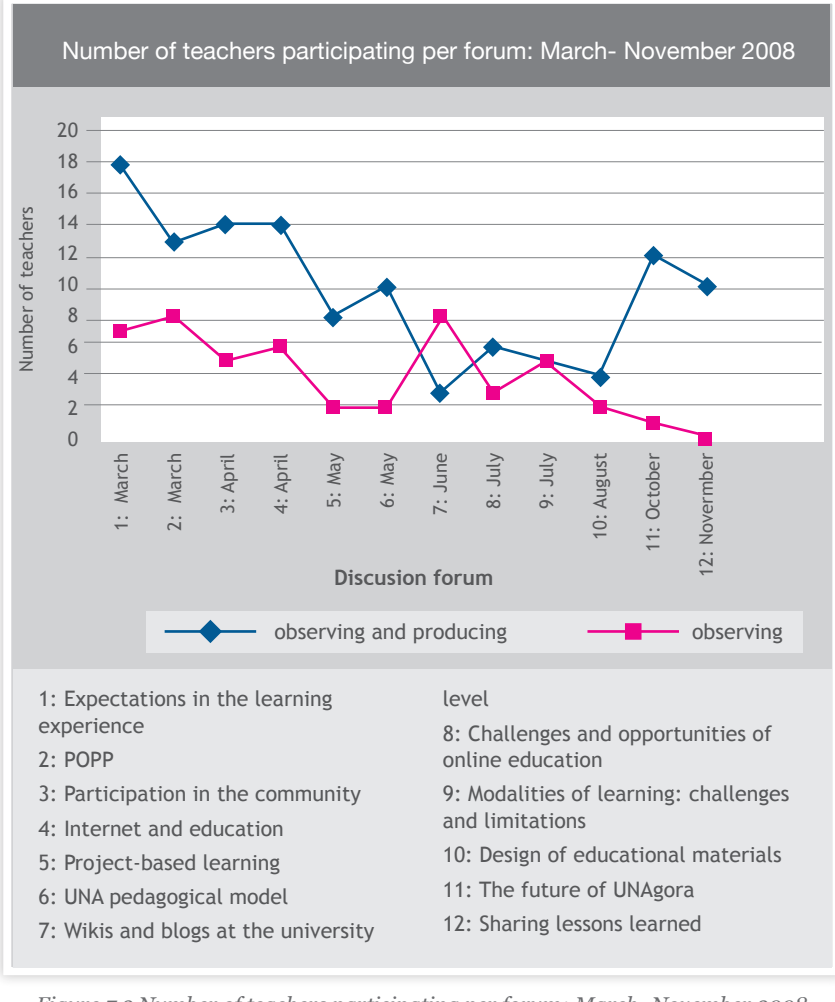


Figure 7.2 Number of teachers participating per forum: March- November 2008

post, and the "passive" participation, meaning reading but not writing. The graphical representation includes the date of beginning of each activity, so the reader could appreciate how participation changed through time.

It is worth noticing that even "passive" participation is an activity that requires time. As Mario explains,

> *[Mario] It is interesting how the level of participation of each person was certainly different. For me personally, and I understand that for other people too, even if we did not participate, we were always close to the community, reading the existing information. And when I say reading, I do not mean a quick look at the website. Indeed, participation in forums and other activities involving the use of quality time. It is not enough to read the opinions of one or two people, it is essential to track all the discussion if you want to get an overall understanding (Forum: Future of UNAgora, November 2008).*

Table 7.2 shows the individual pattern of participation for each member. Eduardo, Lucas, Allan and Alberto gave up the community before June. As reasons for leaving the community, Eduardo mentioned health problems; Alberto got a new position within the campus that required more time and dedication; Lucas said that he had too much work in that semester. Allan did not state any reason, however from his participation, it can be concluded that he was not content with the design of the program, he felt lost and alone (see chapter 6).

From table 7.2, it is possible to deduce that all teachers visited the community at some point and were able to see the discussions. It can be seen that there was a high diversity in active participation (marks with "1"), from null participation (Luis and Nora) to 100% participation (David). Furthermore, it is possible to distinguish four patterns of active participation:

(1) Dispersed participation: Laura, Rodolfo, Mario, Tom, Marta, Rodrigo and Javier.

(2) Continued participation: David, Viviana and Nidia.

(3) Short periods of participation: Pablo, Silvia, Elisa, Rosa, Susan, Lorena, Allan, Lucas, Víctor and Eduardo.

(4) No participation: Luis and Nora.

In dispersed participation the teachers participated during the entire period of the study - however irregularly. Continued participation refers to those teachers who participated fairly regularly during the entire study period. The pattern of short periods of participation includes teachers whose participation was concentrated in certain periods of the

Academic	Participation over time in the discussion forums *											
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
Laura	1			1	1	1	0	1		0		1
Luis	0						0		0			
Rodolfo		1	1	1				1	1	0	1	
Rodrigo			1						1			1
Eduardo	1	0	0	1								
Elisa	0	1	1	0					0		1	
Mario	1	1	0	1	1	1		0			1	
David	1	1	1	1	1	1	1	1	1	1	1	1
Rosa	0			1	1	1	0				1	1
Susan	1	1	1	1			0	0			0	
Viviana	1	0	1	1	1	1	1	1	0	1	1	
Lorena	1						0		1	1	1	1
Tom	1	0	0	0	0	1	0				1	1
Javier	1	1	0	0		1	1	0	0	1	1	1
Marta	0	0	1	1	1	0	0	1	0		1	1
Nidia	1	1	1	1	1	1		1	1		1	1
Lucas		1	1		1							
Allan	1		1	0	0	1						
Nora	0	0										
Alberto	0	1	1	0								
Pablo	1	1	1	1								
Silvia	1	1	1	1			0				1	1

** For teachers that were members of the community for more than three months*

1 – active participation (writing a contribution)
0 – passive participation (just observing)

Table 7.2 Individual participation in the discussion forums

intervention, either at the beginning, middle or end of the study. Teachers who withdrew from the study are in this pattern. The last pattern refers to those teachers who never wrote a post on the forums.

From tables 7.1 and 7.2, it is possible to appreciate that, in general, individual **active** participation in online activities is higher than **passive** participation, with few exceptions: Luis, Tom and Nora. Luis and Nora made few visits to the community website and never wrote a post, but the case of Tom is different, he visited nine forums, and

wrote commentaries in four discussions, three of them considered by its nature, "reflection forums". He only participated in the topic-oriented discussion forum related with the UNA-pedagogical model.

One plausible reason for this pattern of Tom's participation can be that the "reflection forums" did not require preparation in advance, as time was a factor considered an obstacle for teacher participation (section 7.5, O1). In general, the patterns of global participation in the discussion forums are consistent with this appreciation. From table 7.2 and figure 7.2, it can be seen that the points corresponding to the reflection forums (#1, #3, #11, #12) shows the highest peaks of participation.

There was another factor related with the culture of online communication that also limits participation (section 7.5, O9). In the particular case of Tom, at the beginning of the study, he wrote

> *[Tom] When I get used to entering the community and writing anything without fear about what I write, I will. But I am not used to entering a web page and writing a question to generate discussion. There is a mental barrier that prevents us from doing so, but it is part of the change (Perez Zeledon interview, March 2008).*

Furthermore, he participated in all the co-located meetings, and this fact combined with his comment in one of the final discussion forums, reinforce the online communication as an important reason for not participating in discussions,

> *[Tom] With no doubt, UNAGORA offered me a very important space for getting to know more on how to introduce ICT in teaching and learning processes. However, I could not make the most of it for reasons beyond the community. I believe that face-to-face meetings are important in these processes [innovation of teaching practices], especially when participants have no experience in this kind of activity. Nor should we lose face-to-face discussions and exchange of ideas with other participants, perhaps this would be one way that helps members of the community not to lose their motivation (Forum: Future of UNAgora, November 2008).*

Group work: The working groups were established to create mutual dependencies between the teachers and to support the individual construction of meanings through the construction of shared understanding, negotiation, confrontation and commitment (Dirckinck-Holmfeld et al., 2009) in the development of a collaborative pedagogical innovation. The groups were also organized inter-campuses to enable teachers to truly experience the process of communication and collaboration using networked technologies. However, there were a lot of organization and coordination problems, as well as misunderstandings

and difficulties with setting up agreements (see chapter 6 and section 7.5, O7). Teachers argued lack of time, lack of familiarity with technology, lack of group culture and lack of motivation and commitment as reasons for why the group work was not as productive as hoped for.

> *[Alberto] One is accustomed to doing things alone, so you do not know how to act with regards to teamwork (chat April 11).*

> *[Silvia] We all have good ideas, but for me the problem is the technology itself and the little knowledge of how to develop a virtual group project (chat May 16).*

Participation in co-located meetings

Figure 7.3 shows teachers participation in the six co-located meetings that took place during the intervention. Two of these meetings (June and November 2008) were global meetings in Heredia with all participating teachers, and the other four were carried-out in each of the regional campuses.

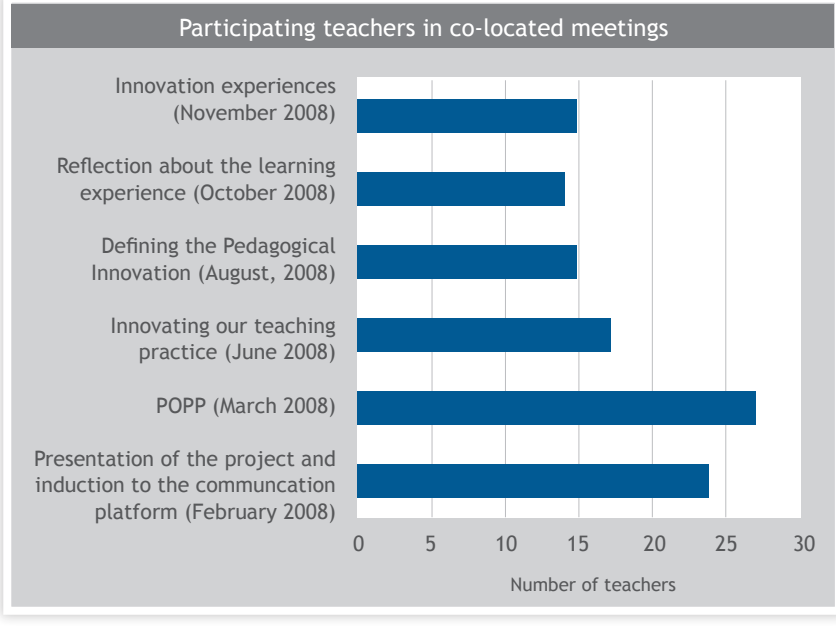


Figure 7.3 Participation of academics in co-located meetings

The data shows that participation in co-located meetings was fairly regular. From table 7.1, comparing the participation in co-located meetings (column B) with global participation in online discussions (column D); it is easier to note the preference for face-to-face interaction

for most of the teachers - again, with few exceptions: Viviana, Javier, Nidia, Marta, Allan and Alberto. The latter two withdrew from the community before June.

Viviana, Javier and Nidia, always expressed a preference for online participation that allowed them to communicate in an environment that encourages debate beyond the physical limitations and provides a new learning domain which enables new and different forms of educational interactions (Maheux & Bednarz, 2008). For these teachers, online communication offers the flexibility not previously available to carry out collaborative learning activities, especially when you live and work in remote locations. The three were competent in using technology as a means of communication.

Marta's case is different because - from the beginning - she struggled with technology, and on several occasions (see Chapter 6) she requested further co-located meetings, mainly in relation to training in the use of the Moodle platform and its facilities. However, Marta had one of the highest levels of presence in the online environment, 92% (Table 7.1, column D), distributed in 50% of the active participation (column B) and 42% in passive participation (column C), and she claimed to have learned from reading and listening to the experiences of other teachers.

7.2 Identification and Engagement with the Community

Engagement defines who belongs to the community of practice (Wenger, 1998). Through the engagement in discussions and collaborative work, the teachers were confronted with the necessity to negotiate their current multiple practices and experiences. The new theoretical knowledge and training in ICT and POPP gave the teachers methodological skills which had an impact on their professional practice towards more focus on collaborative pedagogies and socio-constructivist understandings of learning. However, each participant teacher found a unique place and identity within the community, and it was framed by their engagement and identification with the community. The following analyzes how the teachers themselves perceived their identification and engagement in the UNAgora community. The data come from the final questionnaire in November 2008 and was answered by twelve teachers.

The data of figure 7.4 indicates the teachers' perceptions about their engagement with the community and their participation in the activities. A positive answer to the item considers the sum of the values corresponding to the "totally agree" and "agree" categories.

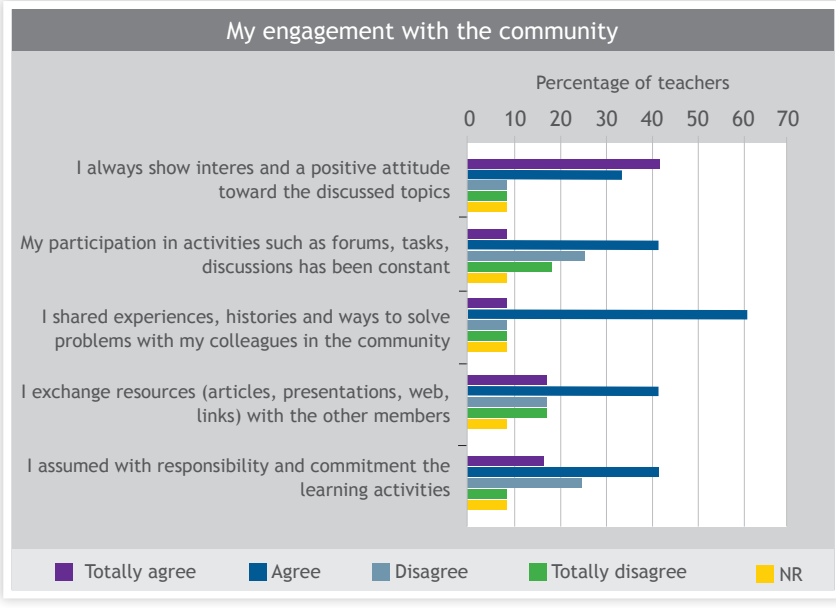


Figure 7.4 My engagement with the community. Questionnaire#3. November 2008

UNAgora has a defined area of knowledge and practice (ICT+POPP) that shapes the domain of the community and establishes the common ground which gives members the motivation to meet, discuss and share. From the first item of the figure, *"I always show interest and a positive attitude toward the discussed topics"*, it can be concluded that 75% of teachers showed interest in the domain of the community and thus in the topics that were discussed. There are many instances in chapter 6 and in this chapter that further support the interest of the teachers towards the domain.

The three following items are related with participation. Participation in a community of practice involves many kinds of relationships, and it requires regular interactions to contribute to the development of the domain and the practice. From figure 7.4, *"My participation in activities such as forums, tasks, discussions has been constant"*, it can be seen that only 50% of the teachers stated that they participated regularly in the diverse proposed activities. In connection with the exchange of experiences *(I shared experiences, histories and ways to solve problems with my colleagues in the community)* and sharing of resources *(I exchange resources (articles, presentations, web links) with the other members)*, activities that both contribute to the development of practice as the community's shared repertoire, the data show that 75% of the teachers were willing to share stories, experiences

and ways of solving problems, but only 58% of them participated in resource sharing. One possible explanation for this situation is that it usually requires less time for teachers to share their stories and everyday experiences than to find additional resources (links, presentations, and articles). Furthermore, sharing of resources requires more technological skills in order to upload files. Both, lack of time and technical expertise were identified as factors that restrict participation (see section 7.5, O1 and O4).

The final item in the graph, *"I assumed with responsibility and commitment the learning activities"*, indicates how the teachers themselves valued their responsibility and commitment to the learning activities. The data show that only 58% of them said they had assumed responsibility for participation in learning activities. However, this value is strongly influenced by the feelings of teachers about their general lack of online participation, since as discussed above, the average rate of participation in the co-located activities was 84% plus 83% of teachers who completed the professional development program (15 of 18) were able to design, implement and evaluate an educational innovation in their classrooms (see Table 7.1). This situation reflects how the teachers created a strong link between participation in the online website and their participation and commitment as members of the community. Because the teachers did not participate online as much as they would have liked, their perception of commitment to the community was weakened.

Wenger (1998) points out that an important condition to be able to negotiate meaning is identification. Identification refers to the degree to which members identify with the community and the extent to which they are empowered to shape the community, and as such it has an effect on the formation of the identity through the mix of participation and non-participation. The negotiation of meanings is therefore fundamental to identity formation. Figure 7.5 indicates the self-perception of teachers regarding their identification with the UNAgora community. The data come from the final questionnaire in November 2008 and was answered by twelve teachers. Again, a positive answer to the item considers the sum of the values corresponding to the "totally agree" and "agree" categories.

The two first items of figure 7.5, *"I am part of the community"* and *"I feel identified with the community and its members"* are related with being a member of the community. From the data, it appears that 83% of the members felt that they were part of the community, however only 66% of them felt identified with the community and its members. Wenger (1998) says that being part of a community requires members to feel familiar with the territory of the community and to be recognized as full members by the others. The "territory" of the community UNAgora

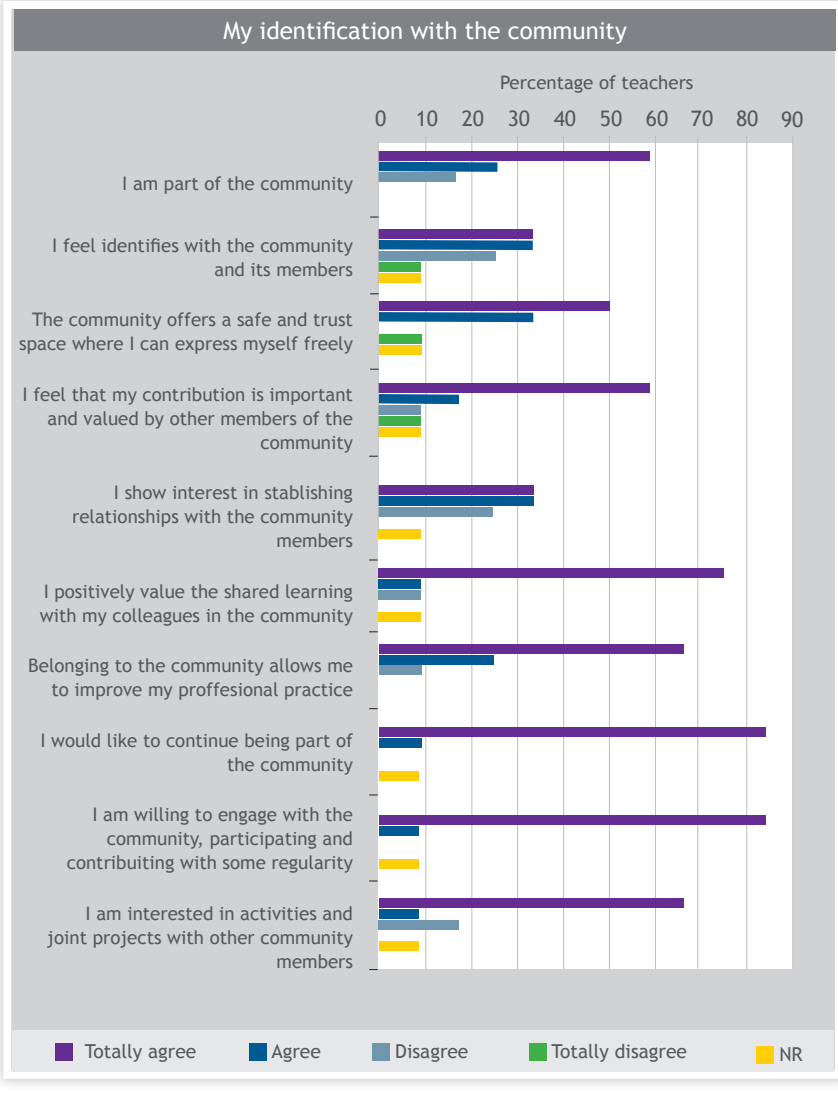


Figure 7.5 My identification with the community. Questionnaire#3. November 2008

was unfamiliar for most of teachers, its domain (ICT + POPP) was new for many of them, and in addition, UNAgora is a distributed community, and as such had a strongly component of online participation. Many community teachers were still in the process of learning how to engage with others, make use of and contribute to the development of the community's shared repertoire. The inability to negotiate meanings can create an identity of nonparticipation and marginality (1998). Hence,

with some exceptions, the teachers did not recognize themselves; neither were they recognized by others as full members.

The next couple of items, *"The community offers a safe and trusty space where I can express myself freely"*, and "*I feel that my contribution is important and valued by other members of the community"*, deal with issues of trust and mutual respect. 83% of the teachers believed that the community offered a safe and trusty space to express themselves freely. In the case of UNAgora, trust has a relatively high rate, even when it is usually more difficult to achieve trust among members in distributed communities of practice (Campbell & Uys; Hinds & Weisband, 2003; Wenger et al., 2002). This trust can be seen in the open and free way in which the teachers presented their thoughts, questions, and doubts (see chapter 6 and 7). In many cases, they exposed their lack of knowledge and were open to criticism as well as to others' teaching practices. It is important to note that, in some cases, there was an existing degree of trust among the teachers of the local campus and participation in the community promoted the consolidation of this trust. In spite of the teachers feeling free to express themselves, only 75% of them reported that their contributions were valued by the other members. This situation can be associated with lack of reciprocity. A community thrives on reciprocity, "on giving back", and in widespread participation in community building efforts (McDonald et al., 2003). When the teachers wrote their contributions, and received no response from the other members, the activity of participation did not generate a net value for them. So, they felt that their contributions were not enough valued for the others to bother to participate. For active participants, fairness dictates that one needs to give back something of comparable value. The lack of reciprocity had a negative effect on motivation and social engagement and, to some degree, devalued the learning process, clearly affecting the cohesion of the community. Instead of the community being invested in the goal of supporting each other through sharing ideas, for some members belonging to the community was characterized primarily by individual goals of knowledge acquisition.

The following two items in the figure, *"I show interest in establishing relationships with the community members"*, and *"I positively value the shared learning with my colleagues in the community"*, indicate the kind of relationships within the community. The teachers' interest in establishing relations with the community members is rather low - 67%. The teachers appreciated the opportunity of communicating with colleagues and supported the aspect of collaboration between campuses. However, the establishment of these relationships has been complex. Given the geographical distance among campuses, only two of the six co-located meetings were "global" meetings with all participating

teachers (the remainder four meetings involved one or two of the closest campuses). These two meetings had a very tight schedule with little room for socializing and the teachers also showed a tendency to sit with their colleagues from the local campus (with whom they have been traveling for many hours). In this respect, the opportunity for establishing social relationships among inter-campuses teachers was greater via the website of the community (with all the already mentioned difficulties). However, despite the difficulties, 83% of the teachers appreciated the interaction and the shared learning with colleagues.

In the following item, "Belonging to the community allows me to improve my professional practice", about 92% asserted that belonging to the community allowed them to improve their professional practice. The community favored the development of expertise, which in turn was transferred to the classroom and had an effect on teaching and learning processes. Through the design, implementation, evaluation and communication of findings about their pedagogical innovations, the teachers provided strong evidence of how the learning in the community had impact on their professional practice (section 7.3).

The three final items showed by figure 7.5, *"I would like to continue being part of the community", "I am willing to engage with the community, participating and contributing with some regularity",* and "I am interested in activities and joint projects with other community members", are related with future participation and engagement. In this sense, it is an act of imagination; teachers extrapolated their experiences, building on the known and familiar, to reach something unknown and unpredictable. 92% would like to continue belonging to UNAgora, and the same percentage stated been willing to participate in the activities and contribute to the community with some regularity. But, only 75% showed interest in participating in joint projects with other colleagues. This data may be explained by the bad experience the teachers had with group work and the elaboration of a collaborative project within the community. This experience might discourage teachers to think in collaborative work inter-campuses (see chapter 6 and section 7.5, O7). From the experience of the UNAgora community, it was fundamental that teachers had to engage with other members in mutual, accountable and negotiable ways. However, it was easier and even more productive for them to establish strong ties between colleagues in the same local campus, and keep a relationship with the other community participants, organized through a model based on relatively weak ties which enable them to interact, learn and get feedback (Jones, Dirckinck-Holmfeld, & Lindstrom, 2006).

7.3 Benefits of Participating in the Community

This study uses a community of practice framework to promote personal and professional relationships among university teachers. The community pretended to be a safe, trusting environment where the academics felt supported and able to transform their teaching practices. Through the analysis of the data, several issues emerged that were considered by the researcher as "benefits" obtained by the participating academics as results of their engagement as members in the community and their participation in the different activities proposed during the ten months period of the study.

The data presented in this section reports on how the participating academics valued their experiences in the community. All postings in the discussion forums, transcription of co-located meetings and interviews, questionnaires data and comments were analyzed for descriptors related to possible benefits of participation. Figure 7.6 displays a view of subthemes that are discussed in this section.

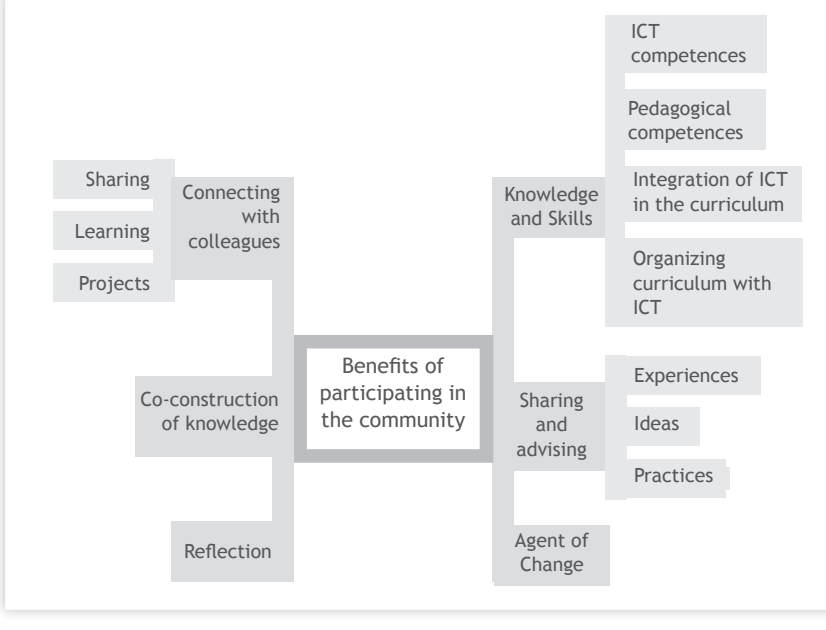


Figure 7.6 Benefits of participating in the community

B1. Knowledge and skills

This professional learning opportunity allowed the academics to learn a new set of knowledge and skills. There were many instances where they made positive comments about being able to explore new pedagogical models and new educational technology. Susan commented in a session of reflection after the workshop in October:

> *[Susan] I was interested in issues that I would not have been able to explore otherwise, learn about new technological tools and their application (Workshop Puntarenas, October 2008).*

To further support this theme, Rodolfo expressed:

> *[Rodolfo] To simply join the community entails learning ... even though I am a computer technician with a daily routine with technology (Workshop Liberia, October 2008).*

One of the most salient expectations of the academics in joining the community was learning, as it was stated by two of them in the first "reflection" forum in February 2008.

> *[Javier] I hope to learn more about technology and its application to education. My experience in using computer technology in the classroom is highly empirical, but nevertheless it is strengthened by several positive experiences, my curiosity and taste by computers and the need for new methods of teaching and learning (Forum: My expectations, February 2008).*

> *[Tom] I hope to learn how to use information and communication technologies in my teaching process to provoke a more meaningful learning in my students. I also hope to share with other community members and learn from their classroom experiences to grow as an academic (Forum: My expectations, February 2008).*

Through discussions, readings, tasks and reflection, the academics were able to develop new understandings about their teaching practices that were directly relevant to their daily practice as seen in the figure 7.7, which displays information from the first questionnaire completed by twelve academics at the end of the first face-to-face meeting on June 2008, 15 weeks after the professional development (PD) community-oriented program began.

At the end of the PD process, the academics' satisfaction rate has slightly decreased as shown in figure 7.8. There were four months between the first and the second questionnaire. In these four months, the academics' participation in the online discussions decreased, and they became mainly focused on designing, implementing and evaluating their pedagogical innovations. In this context, the results of the second questionnaire (Figure 7.7) might be considered as "expectations"

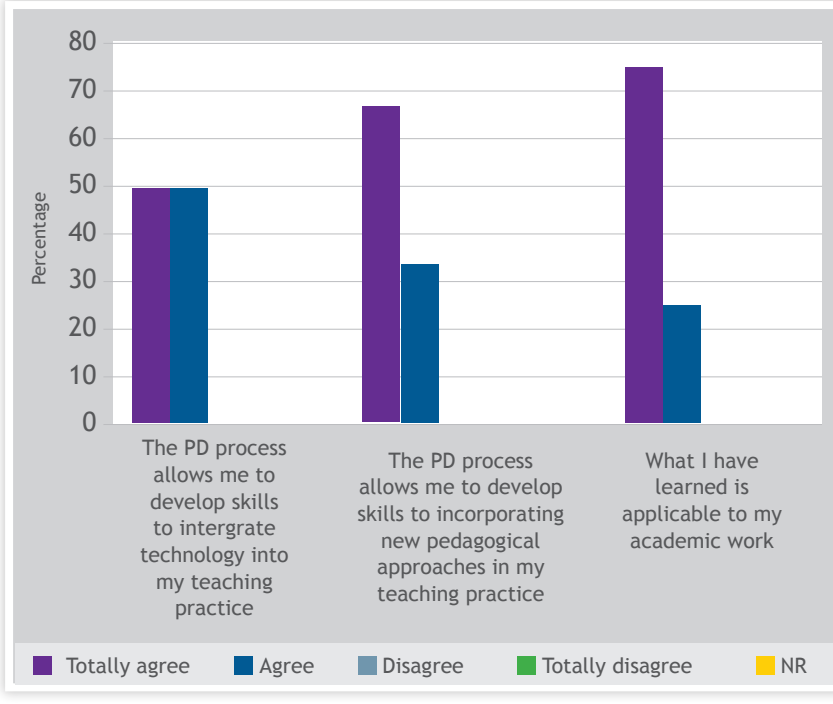


Figure 7.7 Learning in the professional development (PD) process – June 2008

expressed before applying their learning in practice, whereas the third questionnaire (Figure 7.8) shows the results after the implementation of the innovation in classroom. In addition, when the academics were asked in the questionnaire to comment about their learning process, they mentioned problems with the use of technological tools, with the reading of pedagogical documents and with the effective integration of the new knowledge in their teaching practice:

> *What I learned applies to my academic work; however, it is not very easy to do it* (Questionnaire #3, November 2008).
>
> *The learning outcome could be improved if there was prior knowledge of technological tools* (Questionnaire #3, November 2008).
>
> *The reading and understanding of pedagogical and philosophical documents was arid* (Questionnaire #3, November 2008).

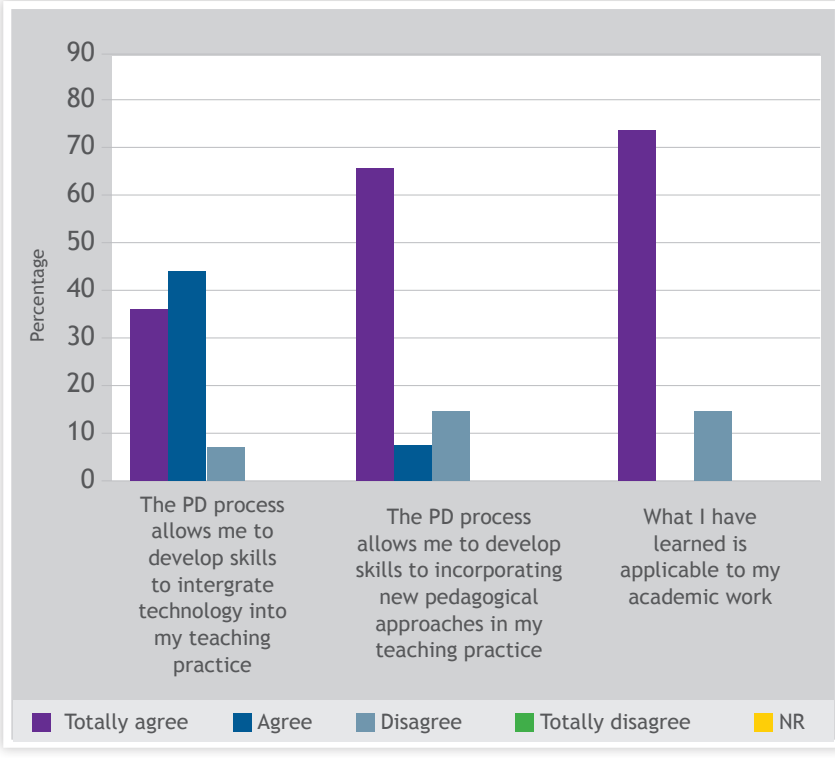


Figure 7.8. Learning in the professional development (PD) process – November 2008

In general, it was possible to deduct that academics with background in education were very comfortable with readings about teaching approaches such as POPP, whereas those coming from more technical areas complained about the difficulty of understanding and applying the pedagogical concepts. These feelings are reflected in the next two comments:

[Mario] Our documentation is very technical and reading those documents…there is a kind of cerebral incompatibility. It is so difficult to sit and read all the philosophical, methodological and educational parts; they are totally foreign themes for us (Workshop Puntarenas, October 2008).

[Rosa] Many of us are professionals in different fields but not in pedagogy. And we can see precisely this impact in analyzing the model. Those colleagues who are educators by profession find it very easy to implement the model, but it is much more difficult for those of us who do not have that training (Forum: UNA pedagogical model, May 2008)

To further refine this category of learning new knowledge and skills, it is possible to distinguish four sub-themes from the data: ICT competences, pedagogical competences, integration of ICT in the curriculum and organizing the curriculum with ICT.

ICT competences

Learning new technological tools was one of the highest expectations for the academics. This sub-theme is related with learning about ICT, meaning a focus on how to use particular tools. Basic ICT competences are learned and valued, as can be seen in the following results from the questionnaires (June 2008 and November 2008). In both questionnaires, there was a question related specifically with the domain of tools, *"The virtual classroom system has different tools for communication and production. Please set your level of familiarity with each of them:"*

From table 7.3 and figure 7.9, we can see a general tendency towards improvement in all the five tools that were considered. For example in the case of "chat", in June, 58.33% of the academics had a "high" level of knowledge about the tool and this number increased to 75% on November, meaning that, in general, the academics moved from "none" and "middle" level towards "middle" and "high" level.

Familiarity with ICT tools	June 2008			November 2008		
	None[1]	Middle[2]	High[3]	None[1]	Middle[2]	High[3]
Forums	0.00	33.33	66.67	0.00	16.67	83.33
Chat	16.67	25.00	58.33	8.33	16.67	75.00
Blog	25.00	33.33	41.67	16.67	33.33	50.00
Wiki	25.00	33.33	41.67	25.00	25.00	50.00
E-mail	8.33	50.00	41.67	8.33	25.00	66.67

[1]None: I cannot use it, neither participate

[2]Middle: I can use it (participate) but not create one

[3]High: I can use it (participate) and create one

Table 7.3. Familiarity with ICT tools

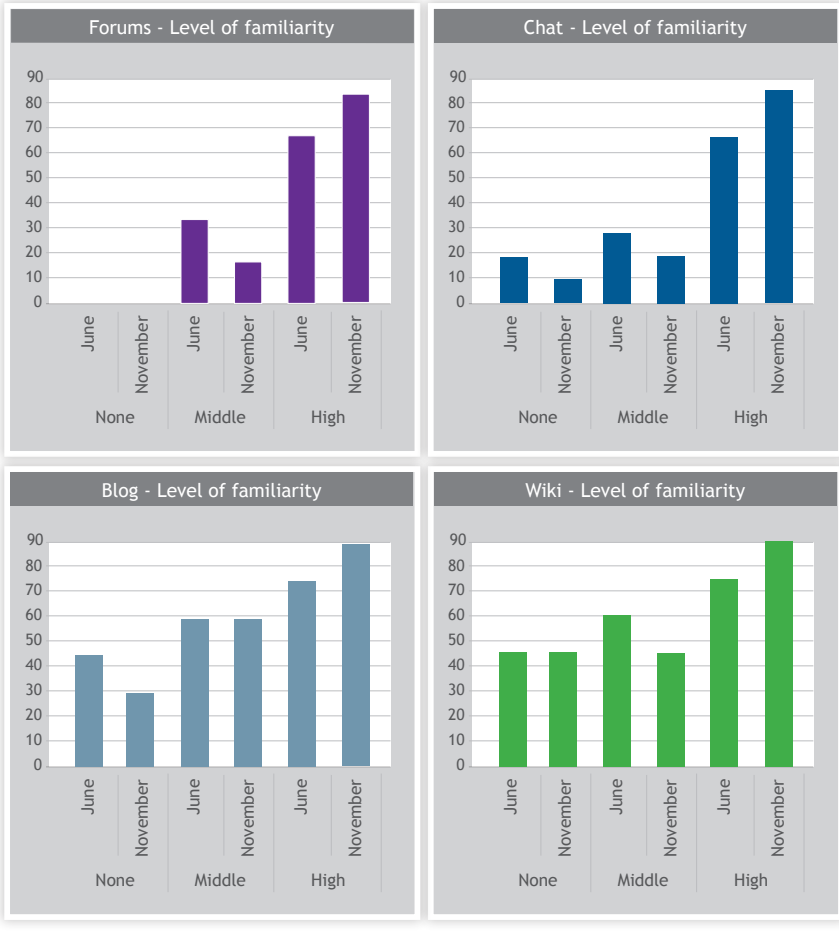


Figure 7.9. Level of familiarity with ICT tools. June -November 2008

The academics expressed some feelings of pride and admiration for their own or their colleagues' new skills within the use of the technological tools.

> *[Lorena] I remember when we were in the process of introducing students to using the virtual classroom. At that time, our schedules did not coincide with the schedule of the computer technician, so Silvia threw herself into doing the introduction alone. She shared that feeling with me "I did the introduction process of the learning platform to my students by myself!!!" (Workshop Nicoya, October 2008).*

In addition to acquiring new knowledge about the technological

tools, the academics were able to transfer this knowledge to their teaching practice in the classroom, as Silvia told us

> *[Silvia] I analyzed the technological tools available and I decided to use Wiki, but during the course, the idea emerged of using forums, so I used two of them. The goal of the first forum was to discuss how students feel using the forum tool and the second one was related with a discussion about a specific subject of the course (Nicoya video conference, November 2008).*

The new ICT competences opened new perspectives for the academics and new expectations about their teaching practice. Nidia and Javier were able to imagine a more complex integration of ICT tools in their practices.

> *[Nidia] I would like to continue working with virtual classroom the next semester at least in one of the courses, to keep learning how to use all the virtual classroom tools and combine it with other platforms more agile and fun for the students as Hi5, YouTube and mobile phones (Face-to-face meeting, November 2008).*
>
> *[Javier] I would like to learn how to maximize the tools that exist in the Moodle platform. I need another challenge; I want to include different tools (Nicoya videoconference, November 2008).*

Pedagogical competences

Changing the perception of the academics about what teaching is about was one of the goals of the intervention. They were exposed to the UNA pedagogical model as a general frame of reference, to different pedagogical approaches such as POPP, and new modalities of teaching such as virtual and blended learning.

By discussing with colleagues and experts, the academics were able to pick up new teaching ideas and integrate or adapt them for their own practices. They acknowledged the role of the community in this process. In response to the question: What is the most important thing I learned in the community? Javier, Rodolfo and Elisa among others answered:

> *[Javier] That there are teaching methodologies that match better with students' interests (Reflection session, Workshop-October 2008).*
>
> *[Roberto] The most important thing we learned was pedagogy and sharing with colleagues (Reflection session, Workshop-October 2008).*
>
> *[Elisa] Sharing new experiences and innovating my teaching*

practice with other pedagogical approaches (Reflection session, Workshop-October 2008).

When the academics were exposed to new pedagogical approaches, they were critical about the proposed principles and how they might entail a change in the academics' role. In the following excerpts, David urges others to be critical and reflective, and Nidia is very critical when referring to academics who prefer keeping a teacher-centered approach.

[David] Personally, and I guess also for many of my colleagues, POPP is something new. Whenever we face something new, it needs to be questioned, as we say, not to take things "for granted". In a quick search on advantages and disadvantages of this model, I found some aspects that are attached. The formation of criteria must be a constant practice especially for us as teachers (Forum: POPP, March 2008).

[Nidia] Many academics feel an imperative existential need to establish a hierarchy in the classroom. The security that it gives to them is destabilized with a didactic perspective that proposes group work and student decision making (Forum: POPP, March 2008).

Despite enthusiasm in learning ICT tools, the academics valued an approach to use ICT as a tool to support curriculum ends. They acknowledge the need for ICT competence but put greater emphasis on the process of socialization and learning. This approach can be appreciated in the goals that they have in mind when designing and implementing the innovation in their courses.

[Javier] The subject of my course is very dense and it is difficult to motivate students. I wanted to change the learning approach in order to motivate students and to change their perception about the subject (Nicoya videoconference, November 2008).

[Luis] The purpose of my innovation is to make a more participatory course, less linearity that can increase criticality in the students (Nicoya videoconference, November 2008).

[Lorena] The group of students was very conflictive; they had communication problems and the subject of the course required group work. I wanted to improve the communication between the students (Nicoya videoconference, November 2008).

Silvia was glad to learn about the UNESCO Standards for ICT and to have achieved an understanding of where she currently falls within this framework and where she can go in the future.

[Silvia] I would like to express how good I felt when I read the ICT Competency Standards for Teachers of UNESCO and I could locate

> *myself in at least one of the proposed levels, which, while it is not high, I know that I am trying to reach the next step. Through this article, I realized that my struggling in understanding this new educational approach of ICT has a single purpose: to implement it in the near future in my university work. In my opinion, and according to this document, I am beginning to acquire the basics of ICT and I look forward to, someday, reaching the deepening of knowledge (Forum: Internet and Education, April 2008).*

Integration of the new knowledge in the curriculum

There is considerable data collected indicating that the academics believe ICT skills should not be the goal for using ICT in classrooms. Through discussions and reflection in the discussion forums (see descriptions in chapter 6), there is a general understanding of ICT as a pedagogical tool that can improve learning and change how learning occurs.

By designing, implementing and evaluating a pedagogical innovation, the academics had the opportunity to put in practice of their new knowledge. This experience was very valued, as Viviana expressed:

> *[Viviana] In the beginning, it was difficult to learn this new form of socialization and community involvement. We learned a lot, and there was much work, but I think the biggest challenge was to implement the innovation. Through these 30 weeks, we learned to use the platform, wikis, blogs, forums, many theories on online and blended learning, and so on. It was a rich experience of learning where we put our learning in practice with the implementation of an innovation led by ourselves. This experience prompts me to enter a master program and it certifies, to some extent, how important these educational experiences are for teachers to renovate themselves. We cannot remain static with our own teaching styles, the world changes very quickly and this community is an example (Forum: Future of UNAgora, October 2008).*

The academics pursued diverse goals in the design of the innovation, such as motivating students (Javier); making a more participatory course (Rodrigo and Luis); promoting reflection and analysis (Lorena); fostering collaborative work (Silvia); changing the attitude of students towards the learning process (Nidia); improving learning through the use of technological tools (Mario and Susan); introducing students to the virtual classroom (David); using videos to analyze environmental problems (Pablo); developing fundamental topics through the use of blogs (Laura); developing new educational strategies in using the virtual classroom (Rosa); and using technological tools to develop a project

about local tourism (Elisa and Rodolfo). The innovations were carried-out by the academics in courses from areas such as Education, Literature, Environmental Studies, Tourism, Administration, Language, Biology, Administrative Law, Humanities, History and Informatics.

Although the pedagogical innovations designed and implemented by the academics showed a strong tendency to include technological tools (forums, blogs, wikis and chats), for many of them the goal behind the innovation was a pedagogical goal supported by technology rather than the inclusion of technology per-se in the curriculum. This can be seen as the beginning of a process in which the introduction of ICT in the curriculum is considered as an opportunity to change pedagogy rather than just an accommodation of ICT to the current repertories.

> *[Elisa] I wanted to promote creative thinking through the integration of different tools..... for me it was a completely new experience and for the students an innovative way to learn, communicate and produce knowledge (Face-to-face meeting, November 2008).*

> [Pablo] Through this innovation, the community [UNAgora] had an impact in other communities [those *in which students did their project] (Face-to-face meeting,* November 2008).

> *[Silvia] This happy face reflects how good I feel now with my academic work and the help of technology, that for a time I considered my enemy. I loved being part of this community (Forum: Future of UNAgora, October 2008).*

In addition to applying their knowledge in practice, the academics, found out how students react to the new strategies through the design, implementation and evaluation of the pedagogical innovation. Lorena, an academic who started more active participation in the community during and after the implementation of the pedagogical innovation, said

> *[Lorena] My students have expressed satisfaction with the process made this year and they hope to continue, although there are always a few of them that are still having fears and technological limitations, but I should acknowledge that also. I have those limitations, but now I do not see it as impossible, I know that I can do it, and I know I can generate changes in methodology (Forum: Sharing lessons learned, November 2008).*

Being capable of making changes [with diverse levels of complexity] in their teaching, the academics were empowered in their practice, role and future perspectives. In this respect, Rodrigo, Luis and Silvia commented with pride:

[Rodrigo] I am very pleased with the effort I'm doing to improve my teaching quality, I know that I cannot return to my old teaching way. I realized that I can continue improving (Nicoya videoconference, October 2008).

[Luis] Today, I say to myself, whether I do not make changes is only because I do not want to (Nicoya videoconference, October 2008).

[Silvia] In the process, I became a facilitator; I have changed my role of being the teacher in front of the class to recognize that students also have knowledge (Nicoya videoconference, November 2008).

The ability of teachers to integrate their new knowledge in practice is further supported by the item *"Belonging to the community allows me to improve my professional practice"* from questionnaire #3. As figure 7.10 shows, 92% of teachers totally agree or agree with the statement. Although the questionnaire was answered by only twelve teachers, the quantitative finding supports and complements the qualitative findings presented in chapter 6 and in this chapter.

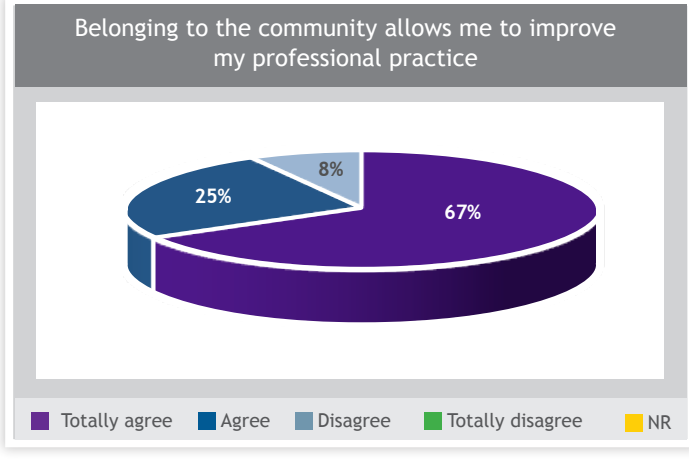


Figure 7.10. Belonging to the community allows me to improve my professional practice. Questionnaire#3. November 2008

Organizing curriculum with ICT

Introducing ICT to change pedagogy entails organizational issues on various levels, and it was a topic that often emerged in conversations. From the experience with the pedagogical innovation, the academics get some "lessons-learned" that might help them in a subsequent experience. Nidia advised to other academics:

> *[Nidia] As well as the innovation is planned, change must also be planned. By this, I mean that I planned the innovation but I did not plan the change I wanted. I was focused on the innovation, on the course syllabus, and later I realized that the change should also be planned (Face-to-face meeting, November 2008).*

Nidia's advice reflects the situation that academics face in some regional campuses where the technological infrastructure and conditions are not optimal. For example, in the Campus where Nidia works, there are wireless Internet and a computer lab, but not all the students have their own laptop and the computer lab is not always available for them. Therefore, when she requested the students to make an ethnographic exercise using tools from the institutional learning platform, the students reacted:

> *[Nidia] The students were angry with me for the introduction of technology into the course if the university did not give them free and permanent access to technology when they wished to study and not just when the administration decided (Face-to-face meeting, November 2008).*

In that situation, Nidia concluded that the administration should provide all necessary resources in time and ensure availability and good condition.

> *[Nidia] The change must be institutional to be orchestrated with the administration and other courses on campus (Face-to-face meeting, November 2008).*

In other levels, Nidia also advised the academics to be better at working simultaneously with few tools of the learning environment; Pablo recommended having at least two weeks of training with the students about the learning platform.

How institutional infrastructure, organization and polices affect processes of changing practices is discussed in section 7.2, "Factors that limit the academics' participation in the community".

B2. Connecting with colleagues

Communicating with colleagues, supporting collaboration inter-campus, learning together and sharing teaching experiences were seen as a benefit of belonging to the community, as it is indicated in the following comment by Mario

> *[Mario] Over time, it was clear that it [the community] was not just learning computer skills for innovation but also the acquisition of pedagogical aspects together with an interesting way of learning, where it was possible not only to learn from*

> *experts in the themes but also from colleagues with an invaluable domain expertise. Undoubtedly, a community with a shared vision generates growth in each of us of a more complex nature than when we strive to acquire knowledge individually (Forum: Future of UNAgora, November 2008).*

The community facilitated the continuous communication between its members. Rodolfo and Susan expressed this benefit as being able to share ideas and talk to others outside of the work setting,

> *[Rodolfo] Only rarely do we have the opportunity to share ideas and knowledge with colleagues from other regional campuses (Workshop Liberia, October 2008).*

> *[Susan] In one moment, I had more contact with the community than with people here (Workshop Puntarenas, October 2008).*

Several participants mentioned appreciating the opportunity to participate in the online conversations with others and to share perspectives and ways of thinking, as illustrated by Viviana,

> *[Viviana] We do academy in the hallways, and what would be better than having a virtual hallway where to meet with peers who are not physically near but are close in concerns, profession and knowledge (Forum: The future of UNAgora, November 2008).*

Marta expressed the benefit of connecting with others differently. She said that just knowing that people are there and ready to learn together, encouraged her to continue learning.

> *[Marta] I learned a lot, I have gained a lot of courage, but I still have a long way to go. The important thing is to know that you are there and we can learn together (First face-to-face meeting, June 2008).*

Being a member of the community allowed the academics to reformulate courses together with other colleagues, to strengthen bonds of friendship, and even to think in future projects with colleagues of other regional campuses. The following comments illustrate this,

> *[Elisa] My project was a collaborative work with the support from Rodolfo and Pablo (Face-to-face meeting, November 2008).*

> *[Lorena] My achievements in this process were to introduce new technology in my classes; to overcome my own fears and my technological limitations; to obtain motivation to continue the training process, and to strengthen bonds of friendship and support with my colleagues from the regional campus (Lorena; Nicoya videoconference, November 2008).*

> *[Rosa] I would like to work with other teachers inside and outside the campus (campus Coto with Perez Zeledon, or Campus Coto with Nicoya and Liberia) on some subjects of the courses in which I will continue using the virtual classroom (Forum: Future of Unagora, November 2008).*

B3. Sharing/advising

When the academics were asked about the most important thing they learned from the community and what they did well as a community, eight out of 14 academics mentioned aspects such as sharing and support of each other; sharing new experiences; sharing ideas; and sharing practices. As an example, Rodolfo answered:

> *[Rodolfo] For me was sharing with colleagues in one of the few learning processes that I have enjoyed (Workshop Liberia, October 2008).*

Sharing is a deep feeling in those who were participating in the community, as Pablo expressed,

> *[Pablo] To feel satisfied one has to share the experience with somebody..... It's the same here at the campus, we support each other. Each community member has something to contribute, to give (Workshop Liberia, October 2008).*

Advising was a permanent issue among the members. Some academics draw on the experience of others to avoid difficult situations and to make their job easier, and other academics draw on their own experience to advise others,

> *[Nora] There is an accumulated amount of experience among my fellows that makes my work easy ... we work together; discus; and this really makes things easier (Workshop Nicoya, October 2008).*

> *[David] It is not the same to design a course for a face-to-face modality than for a virtual environment. If it is difficult, you need to start slowly and gradually, and in order to stay out of administrative problems, you need to communicate to your superior that some sessions will be virtual (Face-to-face meeting, October 2008).*

Acknowledging that some members had more experience invited others to seek and receive advice, as it is shown in the following dialogue between Alberto and David, which took place when they were both coordinators of a group.

> *[Alberto] Greetings, David. I believe you have great expertise in the Moodle platform. I would like to know your experience with*

the group you are coordinating. What have you done? How have you increased the group work? What was the response? This in order to understand my task a little better (Forum: Participation in the community, April 2008).

[David] Greetings Alberto, actually the platform is very friendly when you lose your fear. From my experience, I used all possible means (including smoke signals) to get the widest possible participation, yet the members have limitations that prevent full participation. Given this situation, I must admit, I have tried to exert pressure, and sometimes I assume that everyone agrees with the proposals, because no one answers me..... (Forum: Participation in the community, April 2008).

The academics also discussed sharing in terms of benefits to themselves or to others.

[Lorena] I need the support of the community for continuing in my process of innovation, especially from campus colleagues. We have already begun this process, and now we can offer support to colleagues who also want to start the innovation process (Nicoya videoconference, November 2008).

B4. Co-construction of knowledge

The co-construction of knowledge can be seen as one of the benefits of the participating teachers. They mentioned having enjoyed conversations with other colleagues, participation of experts, readings about relevant themes and reading others' opinions and thoughts. The integration of these activities allowed them to discuss, negotiate, reflect and co-construct knowledge. The following extract of the discussion forum about PBL illustrates the academics' concerns regarding the possibilities and difficulties in implementing the project-based approach in the UNA context.

[Rosa] I find it very interesting to use projects to enhance learning, but we are facing a wall: The students are used to having exams that measure only the concepts that teachers transmit to them.... My question is how to overcome the learning techniques to which the students are accustomed? (Forum: Project based learning, May 2008).

[Viviana] My concern is related with the teachers, ..., what are the skills that a teacher must have to conduct a successful experience of teaching and learning through the development of projects? What skills, knowledge, attitudes and skills should we should or develop to enter into this pedagogical paradigm? (Forum: Project based learning, May 2008).

> *[David] I think that as teachers we are in a turning point (in time) regarding new methods of education mediated by ICT, and methodologies such as project-based learning invite us to try these new concepts (Forum: Project based learning, May 2008).*
>
> *[Rosa] Hello David, you are quite right. But, is not that I stick to changes, but the problem, I insist, is what methodology is needed to get the students enthusiastic about the new technique? (Forum: Project based learning, May 2008).*
>
> *[Marta] My question is how to overcome an evaluation system that is so traditional and sometimes behaves so radically? How can the university system be flexible and how can students adapt to this model? (Forum: Project based learning, May 2008).*
>
> *[Mario] I think the difficulty rarely lies in the student but in the rigid structure of the assessment systems... with tests as the only means of evaluating the learning process. It is a challenge to change those structures and it should be very interesting to include it [PBL] in a formal course (Forum: Project based learning, May 2008).*
>
> *[Nidia] If we implement the model, we would have five courses in Coto with five innovations ... for almost the same group of students. We would be overloading the students and the campus with many changes? ..... Are these valid considerations or am I just worried about the change? (Forum: Project based learning, May 2008).*

Throughout all the intervention, there was considerable data collected illustrating the negotiation of meanings and the co-construction of new understandings about topics that were relevant for the academics and their innovation processes.

B5. Agent of change

Silvia summarized her biggest achievement in the process, as being able to provoke, through the innovation process, a lot of expectations among students and academics.

> *[Silvia] The process caused a big impact on other teachers because our students are talking about our courses and teachers are showing interest in knowing more about our innovation process..... I created a lot of expectations among students and teachers and that is the most important achievement of the process (videoconference Nicoya, November 2008).*

Being an agent of change is considered a benefit for the academics themselves and for other academics inside and outside the community

as well. The following comments, given by the academics in the Forum "The Future of UNAgora", illustrate that some academics are willing to be agents of change in their campus.

> *[Lorena] I believe that we, the pioneers, must assume a leadership role in our campus. The single fact of seeing us working differently has provoked colleagues to want to be part of this new way of teaching. It is necessary that we keep in touch and receive more training; "the wheel has started to turn and cannot be stopped" (Forum: Future of UNAgora, October 2008).*
>
> *[Rosa] This Thursday we have a meeting of teachers and I wonder if you [UNA-Virtual] may allow me to make a list of teachers who are interested in being trained to be part of UNAGORA (Forum: Future of UNAgora, October 2008).*
>
> *[Elisa] The experiences have been positive for everybody, some of them highly positive and for others not so much, ... If I consider these experiences as the starting point for the future of UNAGORA, I think there is a long way to go yet, and we must call upon others to join us, hence this community can keeping growing (Forum: Future of UNAgora, October 2008).*
>
> *[Silvia] The fact that our colleagues observe us planning lessons differently and see that my students, also students of theirs, are always expectant of what is new in my course, promote curiosity and enables them to reflect on the need for growth and production of new forms of learning in an innovative environment such as the Community. I think from now on, we must assume the leadership.... We must be communicators of the process and urge our colleagues to get involved in this process. You can count on me to motivate those who already started and future colleagues to continue innovating in our daily tasks (Forum: Future of UNAgora, October 2008).*

B6. Reflection

During the ten months' period of the intervention and through their own innovation processes, the academics were able to reflect on several issues such as their role, the students' role, the role of technology and the role of the institutional pedagogical model in the educational process.

By discussing with colleagues and with experts, readings and the implementation of their innovations in classrooms, the academics began to see the classroom as a more complex system. They had the opportunity to rethink their practice and, as a result, some of them were not only focused on contents, but paid attention to the whole process of learning, considering elements that are not usually thought

of as fundamental to the achievement of the course goals, for instance, feelings and relationships between students.

> *[Rodrigo] The role of the teacher shifts from a traditional to a one more modern, more participatory role, which offers students greater participation. Several of us are building a more meaningful learning, with more participation from students. We are changing the traditional view that students have about education (Face-to-face meeting, November 2008).*

> *[Silvia] I was very focused on the quality of the essay and I was not concerned about how they felt about writing essays. They were afraid, had never written an essay, even in Spanish ... then I started paying more attention to the "how" and not just to the outcome. Now, I am also interested in the process, not only in the final product (Workshop Nicoya, October 2008).*

> *[Lorena] I wanted to change the communication patterns they [students] had. It was my first challenge, to provide them with a space in which they could talk in a respectful and collaborative way (Workshop Nicoya, October 2008).*

During the study, the academics saw themselves as students who were learning topics totally new for many of them. It has changed the relation with their students and their willingness to admit - in front of their students - their lack of knowledge in some areas.

> *[Nora] A more horizontal relation with them [students] is fundamental.... We need to break up the image of "I am the teacher who knows everything".....now we are in the opposite position (Workshop Nicoya, October 2008).*

> *[Silvia] The students should know that we are learning too. I asked for help from them, "I am a student, I make mistakes" (Workshop Nicoya, October 2008).*

A theme that emerged several times during the process was students, their understanding of the learning process and their role. Many academics tend to think of the students as lazy and passive persons that are used to learning in a very traditional educational model.

> *[David] Our students are very lazy. We have our own culture on learning (Perez Zeledon Interview, March 2008).*

> *[Silvia] Here, the students are very passive. I think that beginning this work with problem-solving and projects would be a good idea to make them react (Nicoya Interview, March 2008).*

> *[Rosa] I find it very interesting to utilize projects to enhance learning, but we face a wall: The students, ..., they have grown up with other systems in primary and secondary schools,*

> *therefore when we try to innovate at the university level, we are exposed to great failures (Forum: Project based learning, May 2008).*

In addition, in one of the first forums in the community, some academics expressed concern about the negative reaction from the students when facing changes in the teaching process due to their traditional culture of learning. But after the experience of innovation, they changed their former opinion and acknowledged the positive response from students. All academics reported a change in their students' attitudes, more motivation and an improvement in their interest and engagement in the tasks of the courses. This situation can be illustrated with two quotations from Rodrigo, one in March and the other in November.

> *[Rodrigo] If teachers do something different, they [students] are not going to accept it, they will reject it, so it will be a big challenge for all of us (Nicoya Interview, March 2008).*

> *[Rodrigo] We got more motivation and participation from students. They showed greater interest in the topics proposed and expressed having better opportunities to argue and discuss (Nicoya videoconference, November 2008).*

Some academics, such as Lorena, Rodolfo, Javier, Nidia, and Rodrigo, incorporated specific objectives in their innovations to contribute to changing the roles of the students and their perception of the learning process.

> *[Nidia] I wanted to change the attitude of the students towards the learning process and move them from passive receptors to more active learners (Face-to-face meeting, October 2008).*

In their final reflections, the academics reported a significant change in their perceptions about how the role of technology and more student-centered pedagogical approaches were received by the students. Viviana reaffirmed the positive response from the students when she introduced diverse technological tools in her courses:

> *[Viviana] The use of new resources: videos, forums, and blogs have been demanding for me, however the students are more active and they tend to develop greater criticality (Forum: Moving Forward, August 2008).*

The academics were questioning the vision and principles of the UNA pedagogical model and how coheres with pedagogical approaches such as POPP. This discussion made the academics reflect about their practices, the practicability of the model and pedagogical strategies they would use to promote the principles identified in the model

> *[Nidia] It has been my participation in this process and the*

> *re-reading of the UNA pedagogical model that made me take the decision of renovating my teaching practice (Forum: UNA pedagogical model, May 2008).*
>
> *[David] Is the pedagogical model an institutional requirement (visible) or is there actually a formal model (hidden)? In which model am I? What are the advantages or disadvantages of both? Or are we perhaps a mix of models in our daily academic experience? (Forum: UNA pedagogical model, May 2008).*
>
> *[Rosa] I totally agree with David, the UNA Pedagogical Model facilitates the incorporation of new and innovative approaches to learning. But to see if the model is working is another matter. In my opinion it is adversely affected by the following aspects: a) almost complete change of faculty due to massive pension; b) the intrusion of political problems within the administrative direction of the institution; and c) lack of institutional organization for bringing training where it is needed. Based on this assessment and in an analysis of the pedagogical model, I might say that the model is a wonderful utopia, but unfortunately the reality is different (Forum: UNA pedagogical model, May 2008).*

Summary of section 7.3

This section presented the data associated with the theme "benefits of participating in the community".

An analysis of interviews, discussion forums, questionnaires and transcriptions revealed benefits that could be associated with the academics' participation in the community. Having the opportunity to share, learn, and participate in the community was very valued by most academics. In particular, they regarded the design and implementation of their pedagogical innovations as the culmination of a learning process.

The participation in online discussions and in face-to-face meetings was helpful for the academics. They learned from experts and from being connected to each other during 10 months. They also enjoyed sharing experiences and advices.

The data suggest that the academics improved in their knowledge about pedagogical approaches and in their ability to support learning processes with technology. The data also suggest that the academics' attitudes and beliefs towards the teaching-learning process have changed. They got a new understanding of their role and their possibilities to transform teaching practice.

In general, the academics expressed that their experience in the community, the learning process, and the new set of knowledge and skills

that they obtained from their participation were relevant and helpful in transforming their current practice. Furthermore, they had overcome fears and limitations, and some saw themselves as agents of change.

Even though the academics acknowledged the value of being a member of the community, it was not easy for them to participate as much as they wanted. Throughout the study, it was possible to detect factors that influenced the academics' participation in the community. The next section and sub-sections present these factors and their impact on how and the degree in which the academics could participate in the different activities, thus affecting their individual and the overall community participation.

Reviewing these factors provided a second level of understanding about the scope of the potential benefits of being a member of the community. This will be further discussed in the next chapter.

7.4 Factors that Motivate Academics to Participate in the Community

For me the purpose of participating in the community is undoubtedly sharing ideas, knowledge and expectations of educational innovations with the support of ICT. It is also important to highlight the shared experiences and the togetherness of people from different disciplines and campuses (Susan, Workshop Puntarenas; October 2008).

Participating in the community has different meanings for different persons. In the above quotation, Susan expressed what the community means for her and what motivates her to be part of and participate in it. Figure 7.11 displays a view of concepts that are considered motivators for participation. This section highlights some of the relevant aspects of each factor with quotes from interviews, posts, and transcriptions of co-located meetings.

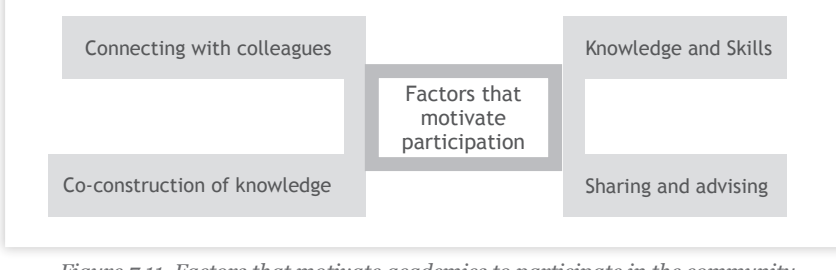


Figure 7.11. Factors that motivate academics to participate in the community

M1. Establish new relations

The participation in the community allowed the academics to establish links with colleagues within and outside their campuses. These "local" and "global" relationships were a motivating factor for most academics. The community was seen by its members as a space that enabled them to:

> *[David] Transcend spatial boundaries to meet colleagues who shared the same expectations (Reflection session, Workshop-October 2008).*
>
> *[Susan] Break the spatial limitations of communication (Reflection session, Workshop-October 2008).*
>
> *[Nidia] Establish a network of teachers with whom to exchange in the future (Reflection session, Workshop-October 2008).*

When academics knew other members beforehand, the community allowed them to revive relations and strengthen ties and trust.

> *[Rodrigo] I did not feel very confident using technology, so I sought the support of my colleagues to try to use it in the best way. They gave me great support and it motivated and helped me to continue with the community and the innovation (Workshop Nicoya, October 2008).*

M2. Professional development

The academics were motivated by their individual interests and by aspects that they found relevant to them, such as improving skills in dealing with educational technology and learning about pedagogical approaches. Besides, the university, and hence the regional campuses, were promoting actions for academics to renew their teaching practice with ICT support. Although, until now, the process has been voluntary, some academics perceived a kind of institutional pressure in this area.

By participating in the community, the academics hoped to learn and make a change in their teaching practice in terms of pedagogy and the introduction of ICT. They expressed being conscious that students were demanding new things and it put pressure on them to make changes in their daily practice. As part of being members of the community, they hoped to take what they learned and apply it in classrooms. This expectation of acquiring a new set of knowledge and skills in order to improve teaching practice proved to be one of the main motivations for participating in the community.

> *[Alberto] In my work, I try to do the best and if I accepted the challenge of educating professionals, I should do it in the best*

way possible (Nicoya interview, March 2008).

[Luis] For me, the overall purpose of this community is to stay together and share practical teaching experiences that help us to promote improvements in our teaching-learning process (Workshop Nicoya, October 2008).

[Tom] UNAGORA offered me a very important space for knowing more on how to introduce ICT in teaching and learning processes (Forum: Future of UNAgora, October 2008).

[Pablo] It is a valuable opportunity to grow both academically and personally, even more so by the diversity of fellow participants, with whom we share many interests (Forum: Expectations in the learning experience, March 2008).

[Viviana] My interest in participating in the community is at the pedagogical innovation level, because in my discipline I was not trained for teaching. I want to apply what I learned in my practice and I want to see the results (Face-to-face meeting, June 2008).

[Rosa] Students are demanding new things....we have to change (Face-to-face meeting, June 2008).

For many academics, learning was their initial expectation and motivation to participate in the community and, for most of them, that expectation was met because what they learned was relevant to their current professional activities and they had the opportunity to reify this learning through the development of the pedagogical innovation. Figure 7.12 shows the answer of twelve academics to the issue: The development of the pedagogical innovation allowed me to apply what I learned in the professional development program.

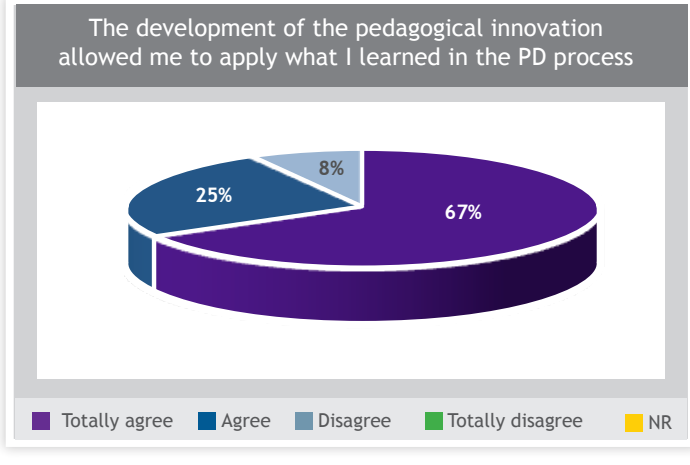


Figure 7.12. Perception about the usefulness of the pedagogical innovation

M3. Personal engagement

The academics were more excited when something from the community became relevant to their actual work, as is illustrated by David,

> *[David] There are two things that made my involvement in the community easy, first, knowledge of the Moodle platform, and second my personal motivation. This motivation comes from my job. Right now, I am designing two bimodal master programs, and I would use the MOODLE platform. Also from the pedagogical point of view, I think POPP could be an option to be used in these master programs (Forum: Participation in the community, April 2008).*

The fact of having changed, to some extent, the way they were used to teach, provoked motivation for participating in the community activities.

> *[Rodrigo] As a teacher, it promoted personal growth and a greater satisfaction with what I am doing. When you are innovating, you feel satisfied and willing to keep doing new things for students (Nicoya videoconference, November 2008).*

Lorena, who is also attending the course "Educational Innovation" in Heredia, commented her engagement with the community and the pedagogical innovation in the following terms:

> *[Lorena] Because everyone is starting the process, but we are already implementing it [the innovation], so my students and I felt WOW ... we are going forward. It motivates me because we have the experience of working with students and that is a very rich experience (Workshop Nicoya, October 2008).*

M4. Be part of something

Being part of something bigger is a strong motivation for some academics. For academics that work in regional campuses, their teaching experience can be richer and less isolated by strengthening professional and personal ties. They feel connected to others and feel that they are contributing to improve teaching practice at institutional level, as can be read in the following answers that academics gave to the question "Why is it worth for me to belong to the community?"

> *[Rodolfo] Status and being a privileged participant of the first virtual community (Reflection session, Workshop-October 2008).*

> *[Pablo] Being part of "something big", being part of and contributing to the institution (Reflection session, Workshop-*

October 2008).

[Laura] Undoubtedly prestige; becoming an expert always gives satisfaction. A teacher must be one who knows (Reflection session, Workshop-October 2008).

Silvia expressed the feeling of "being part of", talking about one big family.

[Silvia] I hope we meet again in future work and continue sharing our experiences. By the end, they are joint experiences because we became UNA big family (Forum: Future of UNAgora, November 2008).

Despite of central or peripheral participation, most of the academics had feelings of belonging to the community UNAgora, as it can be seen in figure 7.13 that responds to the item "I am part of the community", in the second questionnaire.

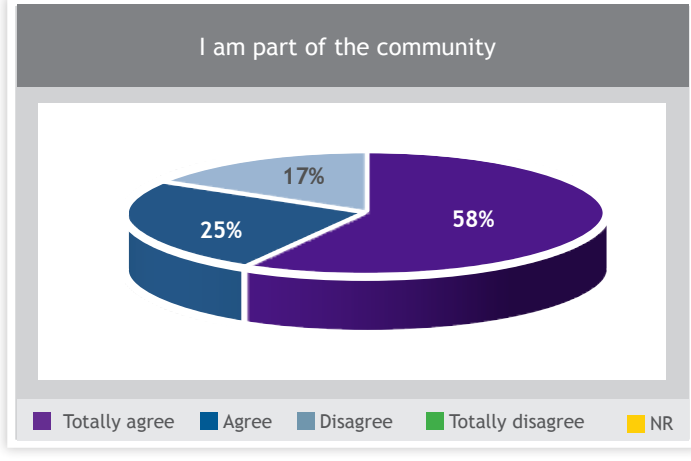


Figure 7.13 I am part of the community

7.5 Factors that Limit Academics' Participation in the Community

At first it was very frustrating for me, I was clear that I wanted to innovate my teaching practice. I tried to work on Saturdays because on weekdays it is impossible, there are plenty of things to pay attention to, but I came [to the university] and I had no idea how to start. Even though innovating teaching practice is part of the campus strategic plan, I am not skilled in technology, so I could not do it by myself. Therefore, I decided to go to Heredia [to have face-to-face training] and now I am progressing in my

innovation and I am more prepared and motivated to be part of the community in an effective way (Nora, Workshop Nicoya; October 2008).

Throughout the study, as it is illustrated by the previous quotation from Nora, the academics faced many obstacles to fully participate in the community. This section provides a summary of these factors supported with quotations from interviews, posts in the discussion forums, and transcriptions of co-located meetings. Figure 7.14 shows a view of concepts that are considered hindrances for participation.

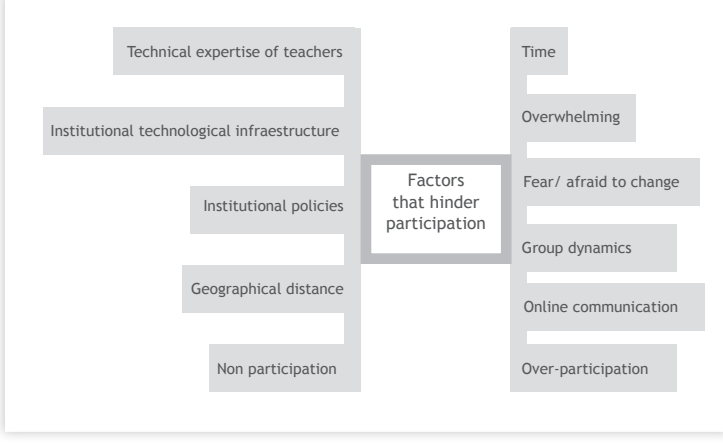


Figure 7.14 Factors that limit academics' participation in the community

O1. Time

Time is the most important factor that hinders participation. In most cases, there was always a tension between teachers' jobs at the university, personal time and time for professional development. Daily activities at the university often interfered with the activities proposed in the community, as Alberto who is the Director of one of the regional campus, expresses in the following

[Alberto] One aspect that has hindered my participation is the time-consuming position that I have in the campus. However, I participate with some frequency. This week has been difficult for me. But, I keep my expectations for the community and would like to learn more about the learning approach based on projects and problems (Forum: Participation in the community, April 2008).

The academics were struggling to bring the community into their

daily routine. Normally, many of them did not have serious problems with attending co-located meetings (as it can see in Table 7.1), but found that time for online participation was much more difficult for them. Lorena, an academic who decided to complement her participation in the community with the face-to-face course Educational Innovation, explains this situation. In her case, although the round trip to Nicoya-Heredia is approximately six hours, she felt that being outside her workplace gave her the time she needed.

> *[Lorena] When I am here [the university], I have thousands of activities, but when I decided to go to Heredia, I was able to have the time needed to focus on the innovation, to make the readings and to participate in the community (Workshop Nicoya, October 2008).*

An issue that often emerged in conversations was the academics' reflection of being part of an online community is a time-consuming process. Susan expressed that it would take more time to get used to participating in an online experience which is new for many of them.

> *[Susan] My participation has been low and I think it has to do with the fact that I am not the kind of person who writes much in chats or similar, besides of having little time and a couple of personal problems that have forced me to get away from the community. But I have begun to notice that I am participating more and more often each week, I think it is a process in which one engages little by little, especially if we are not used to it (Forum: Participation in the community, April 2008).*

For some academics, such as Lucia, the lack of time was so overwhelming that they left the community but not without having tried to manage it. In April, Lucia expressed regret that she could not do more, but explained that she just did not have time, and finally, she left the community in May.

> *[Lucia] I must say that my main difficulty is the time factor. In recent weeks, I had planned to enter, review and participate at least twice a week. But actually I did it once a week. I could not do it more often due to the many activities in which we are immersed. I hope to improve and get used to the idea of being more connected. Definitely, this requires more time than I thought. I am sincere when I say that I will do my best (Forum: Participation in the community, April 2008).*

O2. Overwhelming

For several participants, the activities in the community were overwhelming. They expressed the aspects that overwhelmed them in

diverse ways,

> *[Javier] There were a lot of content, lots of tasks to do and we did not have enough time. Most of us are part-time teachers, 90% are hired by temporal contracts, and then we must have other activities [outside the university] (Nicoya videoconference, November 2008).*

> *[Pablo] In order to participate, you need to make 2, 3, 4 different readings, so many times I was not ready to participate. In addition, for the second or third chat I did all readings, and I did not use them. So, you had to read to participate and, those times you did read you do not discuss them, and then I began to lose interest (Workshop Liberia, October 2008).*

To the extent that the community increased in complexity, there was more information available, and some academics tended to feel lost, as Allan who complained that he could not find the activities, that there was too much information, and he did not know what to do when visiting the community.

> *[Allan] I just want to say that is not working as I thought. It seems that there are activities that we are not doing and are difficult to do, and it does not seem to make sense... is a problem ... for some, because we only have few hours to participate and need more ... others definitely do not know the meaning of this, or because upon entering the website, you feel lonely ... is like writing in the wind ... something happens (Forum: Participation in the community, April 2008).*

For many academics, the fact of combining the design, implementation and evaluation of their pedagogical innovations with the regular activities of the community, such as readings and participation in discussions, was overwhelming.

> *[Silvia] I could hardly handle both in a single moment, much to read, lots to do, the theory and practice mixed (Workshop Nicoya, October 2008).*

O3. Fear/afraid to change

"Fear" is the word used by some academics to express a limitation to participate in the online discussions in the community.

> *[Tom] When I get used to entering the community and writing anything without fear about what I write, I will. But I am not used to entering a web page and writing a question to generate discussion. There is a mental barrier that prevents us from doing so, but it is part of the change (Perez Zeledon interview, March 2008).*

> *[Lorena] What makes the dynamic of an online process as the current so difficult?; I think it [participating in online discussions] implies a change of mentality and attitude towards the new. Hence, the importance of having a support group for daring to make that change (Forum: Modalities of learning, August 2008).*

> *[Marta] In my case, and the same for other colleagues I know, we had a hard time breaking the barrier of virtuality and participating in the community. I think it is a cultural issue (Forum: Internet and education, April 2008).*

Similar feelings of fear and being afraid to change were mentioned by the academics as an obstacle to change their teaching practices.

> *[Rodolfo] We do not change our practices in the classrooms for several reasons: 1) ignorance, 2) fear of applying an innovation either with ICT or with new pedagogical approaches, 3) no support from the administration, perhaps they themselves are afraid or having no knowledge, 4) the distance between regional campuses and the central campus; in the regional campuses neither academics or students are taken into account in projects (Workshop Liberia, October 2008).*

> *[Rodrigo] We, as well as students who are participating for the first time in this experience, are very comfortable in the comfort zone and do not want to face new challenges (Forum: Modalities of learning, August 2008).*

At the end of the study and after living the experience of the innovation, many academics feel they have overcome their "fears", as it can be read in the following comments by Javier and Silvia.

> *[Javier] Fears are grounded in our weaknesses and frustrations. Looking down does not make us fall, just fear itself. Let us leave behind fear and take the leap of the educational innovation, enjoying more flying and worrying less about landing (Forum: Sharing lessons, November 2008).*

> *[Silvia] At the beginning, I was afraid if I would be able as a person and as teacher to fit well into this process. I resisted the technology, the only thing I had used was email, but now my achievement is that I know how to use other tools and I lost my fear, I am here participating on a videoconference where I had never been, this is a further proof that I lost my fears (Nicoya videoconference, November 2008).*

O4. Technical expertise of academics

Not all academics have the adequate technological competences to deal with the learning platform and online communication. Although they had received basic training at the beginning of the study; the academics repeatedly requested a deeper and longer training in how to use the Moodle facilities. According to their colleagues, the lack of technological competences was the reason for some teachers giving up the community.

> *[Rodolfo] For example, you say we have to do a wiki and give us a manual, but some people can read the manual eight times and not be able to understand unless somebody helps them ... That was one of the things that failed, you had to take a day or two and teach them to use the platform ... Many people who withdrew from the community did so because they felt totally isolated, they did not know how to participate (Workshop Liberia, October 2008).*

> *[Elisa] I think there was lack of preparation to use the platform's tools, although there were instructions to do things, I would not have been able to carry them out if I had not had the help of these two colleagues ... I was needing more tools to better participate, and to feel that I somehow contributed to the community (Workshop Liberia, October 2008).*

The case of Marta is another example of the above situation. She is an academic who considers herself as a person that is "not used to sitting in front of a computer", and in the beginning of the study she did not know how to participate in online discussions, however she was always very motivated in being part of the community.

> *[Marta] In my case, it is not lack of motivation, but if you have noticed, I entered the website and once there, I did not know what to do? Finally, I gave up and abandoned the website without doing anything (chat, March 7).*

Through time and with help from the facilitator and the researcher, she made progress in her participation in the online discussions.

> *[Marta] Hello colleagues, although many of you would not believe me, ..., for me, writing in this forum is a triumph, and this happened because of the support I received from [facilitator] and [researcher]. As for my limitations for participation, although time has been an important factor, the main factor is the lack of knowledge of the platform because it is a totally new experience for me. I try to enter every day, even just to see what is happening. I am not sure whether I know how to effectively use the tools, but I cannot find news about my new group, which is the number 3. However, my little triumphs motivate me to*

> *continue learning; I hope to catch up with the group (Forum: Participation in the community, April 2008).*

As said before, Marta participated in 5 (of 6) of the co-located meetings, and she had the second most visits to the website of the community. She never gave up the community; however she did not design nor implement the pedagogical innovation in her classroom. She felt that she was not enough prepared to do it.

According to the academics, the lack of ICT competences was an important hindrance for their participation in online activities. After the pedagogical innovation, they were discussing about their openness regarding online learning compared with the response they obtained from students. Rodrigo appealed to the "digital divide" to explain the difference,

> *[Rodrigo] A point to consider is the digital divide. We are used to the traditional model, having to be present in the classroom to learn. If we compare that model with the current students, we are going to find large differences. Students are more exposed to technology and find no great difficulty; instead the change is more significant for us (Nicoya videoconference, November 2008).*

In a similar vein, David and Lorena used the term "digital natives" to refer to students versus "digital immigrants" to refer to university teachers.

> *[David] We are digital immigrants, so for us it is a little bit more difficult, but students are digital natives, they are open to change and are demanding more online activities (Forum: Modalities of learning, August* 2008).

O5. Institutional technological infrastructure

The initiative that is investigated in this study required the support of technological infrastructure to assure the quality of participation and pedagogical innovations with ICT. However, these conditions are very diverse among the regional campuses; hence in some cases, it turned out to be an obstacle for participation.

Academics from Perez Zeledon, Coto, and Puntarenas had problems with internet access and labs. Academics from Liberia commented the general lack of technological resources (laptops, video beams, cameras). Academics from Nicoya reported that they had all the facilities that they needed. The following comments from David, Susan and Silvia illustrate the situation,

> *[David] We have access problems, financial problems, and furthermore we have some mental barriers and we do not want take risks and do more than we usually do (Perez Zeledon interview, March 2008).*
>
> *[Susan] At present, the biggest barrier we have is the network that is very unstable. Also, we do not have support to participate in these activities which we can count on and relieve us of pressure in the work (Puntarenas interview, March 2008).*
>
> *[Silvia] We have resources here; we have technology, a big building, a way to get transportation; a lot of things. Sometimes we are rather lazy (Nicoya interview, March 2008).*

The administration of the institutional technological infrastructure also affects the implementation of the pedagogical innovation in various ways,

> *[Javier] In my intervention project, I wanted to use some blogs and videos, but for security reasons, UNA is blocking many internet addresses related with blogs and videos, and the problem is that many students only have access to internet through the university; therefore they are not allowed to use these links (Workshop Nicoya, October 2008).*
>
> *[Nidia] Campus Coto has wireless internet and a computer lab. But not all the students have their own laptop and the computer lab it is not always available for the students (Face-to-face meeting, November 2008).*

O6. Institutional policies

The full participation in the community entails transforming of practice through the use of new pedagogical approaches supported by ICT. According to the academics, this transformation process should be supported by UNA administration and policies.

> *[Susan] Much support is needed for teachers who implement it [PBL]. We are learning and we are excited about the idea, but if there is no support from the university authorities, we will not be successful (Puntarenas interview, March 2008).*
>
> *[Nidia] I'm worried about the time associated with blended learning. The institution works with parameters for physical teaching, and in proposing a combination; we are investing twice as much time (face-to-face and online). It is necessary that the institution re-evaluates what it means to work in this new challenge of ICT in education (personal blog, August 2008).*

During the study, the academics also expressed the need for more

institutional support regarding their daily workload and the time for professional development.

> *[Viviana] These processes [blended learning] do not simplify teaching work but they greatly complicate it. We must investigate and be in constant innovation and renewal. We have no idea of the role of the facilitator. We need time for learning (First face-to-face meeting, June 2008).*

In some regional campuses, most academics are hired part-time on a temporary basis, and this fact has an impact on their workload, stability and motivation. As an example, Mario and Javier mentioned that, in their respective regional campuses (Puntarenas and Nicoya), 90% of the academics are hired on a temporary basis and their workload is so heavy (teaching, outreach, administrative functions) that they hardly have time for other activities. In these circumstances, is difficult to explore new things.

> *[David] A ten-hour-per-week teacher is working full time elsewhere. Teaching is an extra activity and, with some exceptions, they have no extra motivation to get more involved or learning to do things differently (Forum: Modalities of learning, August 2008).*

O7. Group Dynamics

The group dynamics became problematic for the community members. In each group, only three or four members were participating in discussions and taking decisions. Groups were struggling in setting a chat so they could meet synchronously and this process was complex, difficult and frustrating for many of them. In Lucas's, Rodolfo' and Viviana's words,

> *[Lucas] I find myself somehow frustrated by the limited participation of my group. I have tried to involve members through opening a forum and chat for easier communication, but some do not visit the community for several days. I worry about the inability to perform activities of last week (Forum: Doubts, April 2008)*

> *[Rodolfo] With all due respect for the community, I think my group is having a bad time, participation is null or scarce, and this often discourages people involved... I think you [facilitator group] have to take actions, such as knowing whether these people will continue participating and if not so, then reorganize the groups ... It has been difficult to agree on many things in my group (chat, May 16).*

> *[Viviana] For two weeks I was uploading documents, sending*

> *emails, and creating facilities for the group, and nobody reacted. Some people entered to the group but did not accomplish any task requested, so at some point I made the decision to continue with the community because I wanted to continue learning, but not with this group because it was rather a distraction (Face-to-face meeting, June 2008).*

The inability for the groups to work in an effective way was definitively a factor that negatively influenced academic participation in the community, as one of them expressed in a comment in the first questionnaire:

I think the only mistake [of the intervention] was to separate us into groups when we were just starting to become comfortable with the community. Then, in the groups, we came to feel isolated (comment first questionnaire, June 2008).

The group dynamics weakened the cohesion among members of the community and even led some academics to leave the community.

O8. Geographical distance

UNA regional campuses are distributed throughout the country. For some academics, the geographical distance is a limitation for participating in the co-located meetings.

> *[Susan] It is difficult for us to travel to Heredia and the online communication allows us to be more present in the community (Face-to-face meeting, November 2008).*

> *[Nidia] If you required face-to-face contact, you would kill the community for me...because it takes a 16 hours round trip to go to Heredia, it means, two days of work sitting on a bus (Face-to-face meeting, November 2008).*

> *[Rosa] I know various colleagues at the Campus who are interested [in being part of the community], but like the others, it is very difficult for them to meet outside of Coto (Forum: Future of UNAgora, November 2008).*

O9. Online communication

In some way, technology determined the participation. While for some academics, the online communication allowed them to be part of and participate in the community without leaving their campuses, for others it was an obstacle for having better participation and performance in the community.

According to many academics, it was necessary to create more face-to-face opportunities integrated with online participation. For many of them, this study was her/his first experience with online learning and it had implications for the form in which they conceptualized communication and collaborative work. They did not feel entirely comfortable with asynchronous conversations. They showed preferences towards synchronous and face-to-face communication.

> *[Silvia] I had never taken any online course. As a student I have had the same face-to-face role for more than 15 years, so the total virtuality has always been a problem for me. I like a more personalized learning; I think we all need more face-to-face opportunities (videoconference Nicoya, November 2008).*

> *[Tom] I believe that face-to-face meetings are important in these processes [innovation of teaching practices], especially when the participants have no experience in this kind of activity. Nor should we lose face-to-face discussions and exchange of ideas with other participants, perhaps this would be one way that helps members of the community not to lose their motivation (Forum: Future of UNAgora, November 2008).*

The differences between online participation and face-to-face participation may be appreciated in table 7.2, where for instance Luis had not written a post in ten months but participated in all co-located meetings. Another example of the importance of face-to-face contact can be seen in a group of academics from Nicoya who decided to travel every Monday to Heredia in order to take the course Educational Innovation.

> *[Luis] Personally, I needed the face-to-face course in order not to make many mistakes. Now, I feel more confident and motivated to continue (Workshop Nicoya, October 2008).*

O10. No participation

David defined himself as an "over motivated person in a virtual learning environment". He was personally discouraged when he would come into the community website and find only the facilitator or the researcher to be online.

> *[David] It is truly disheartening to visit the community and see nothing new after two or three days. I feel I am over-motivated, even annoying (Perez Zeledon Interview, March 2008).*

> *[David] At some point, I stated that I was going to commit digital suicide because I felt a bit alone, abandoned, with a need for greater participation from you (Face-to-face meeting, November 2008).*

Nidia was another participant who expressed feelings of loneliness when she visited the community.

> *[Nidia] I felt my participation quite lonely and sometimes confusing because I did not know whether I was in the wrong place. However, I am glad that until now I have learned to organize a forum, a chat and upload documents (Forum: Participation in the community, April 2008).*

O11. Over-participation

As non-participation discouraged some academics to participate, the daily and active participation of other academics also discouraged participation. David was the academic with highest participation in the community. He attended all the face-to-face meetings and participated in online discussions almost on a daily basis. Furthermore, he made many contributions to the community, such as complementary readings, supporting references, and conceptual maps. This very central participation provoked conflictive feelings in some participants,

> *[Rodolfo] Some colleagues felt that there was a digital divide between teachers, because PZ's colleague was involved in everything, so you wondered how he organized his time?; Why can he and I cannot? Then you start to feel bad... (Workshop Liberia, October 2008).*

> *[Elisa] For me it was difficult to participate in the forums. Sometimes I was ready and decided to participate, but when I compared my possible contribution to David's contribution, I felt that I did not have the same level ...so I gave up my intention to write something (Workshop Liberia, October 2008).*

David was a very persistent participant, he always tried to motivate others to participate and sometimes he complained about the low level of participation. These comments were received by some academics as a kind of scolding.

> *[Susan] Even when diversity is healthy, it can also be counterproductive, because of the fact that he wrote so much and then scolded people ...you say to yourself....it is better not to say anything (Workshop Puntarenas, October 2008).*

Despite of these conflictive feelings of admiration and disconcert, David was recognized by the community as a "leader", and his proposal about the name for the community (UNAgora) was supported by the academics. He also suggested a strategy for the future of UNAgora that was supported and complemented by many members of the community.

Summary section 7.4 and 7.5

These sections reviewed the data concerning factors that played a role in the participation of the academics within the community. First, I provided a view of their global participation, and then I introduced both factors that played a positive role and those that impacted negatively on participation.

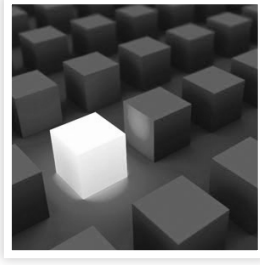
Among factors that motivate academics to be part of the community and participate in the proposed activities, is the desire to establish relationships with colleagues from other campuses and overcome the feeling of "isolation" somehow common in the regional campuses. The academics were also conscious that students, society and the institution are demanding new things, so they expected to learn and to make a change in their teaching practice in terms of pedagogy and the introduction of ICT. For them, being part of the community meant being part of something "bigger" and contributing to the institution in its process of renovating the education.

Despite motivation to participate, the academics faced many obstacles, for some of them the participation in the community was a new experience and it has been difficult. The daily routine and the workload absorbed them, so they did not have much time left to participate in the online discussions and activities. The access to internet was not available for all of them, and the technological infrastructure and policies of the institution needed to be adjusted to fit new modalities of learning supported by ICT.

Many academics expressed regrets for not taking more advantage of the opportunities offered by the community. However, they also acknowledged that the opportunities afforded were benefits of participation.

In the next chapter, these findings are discussed in the context of the research questions and the literature.

Chapter 8



Refining the Design Principles

People ignore design that ignores people.

Frank Chimer

Refining the Design Principles

In chapter five, a design solution was proposed from a synthesis of the relevant literature. It was built on existing models and principles, and inspired by a design-based research approach to explore the design solution through a theoretical application to a specific context. Chapter six dealt with the ways in which the design was enacted by participating teachers, and it documented failures and successes. This chapter analyzes the design solution itself from both perspectives, firstly, the result of the iterative process of testing and refining the prototype solution, and secondly, the retrospective reflection process on the design and its findings (Design-Based Research Collective, 2003; Reeves, 2006).

The first section of this chapter introduces the modifications that were made to the design in the process of adjusting it to the teachers' needs. The following sections examine the design from the conceptual perspectives of the four dualities (participation/reification, designed/emergent, local/global, identification/negotiability), the three modes of belonging (engagement, imagination and alignment), and the teachers' perspective.

The design analysis of this chapter will contribute to answering, in the next chapter, the research question "What principles may be used to guide the design of a professional development model- based on communities of practice for fostering teachers' change of practice?"

Analyzing the learning infrastructure provided by the design is aligned with the fourth phase of the design-based research process "Documentation and reflection to produce design principles", which concerns the retrospective process of reflection upon the design and its findings, in order to refine, add, and discard principles that comprise the researcher's understanding of the experience (Reeves, 2006).

8.1 The Initial Design Solution

Conceptual design principles were developed from a review of relevant literature on Teacher Professional Development, Communities of Practice and Project-oriented Problem Pedagogy. These design principles were used to illuminate the design of an educational intervention in which we aimed to open up a new practice for university teachers. Table 8.1 shows the thirteen conceptual design principles.

These conceptual design principles were further elaborated in the form of guidelines that were built on previous models and principles. The guidelines were classified within Wenger's learning architecture

Design for a learning environment that	
(1)	enables the negotiation of meaning and the mutual construction of new understandings and solutions through an adequate balance between activities and resources for learning
(2)	fosters building of social relationships and trust among academics
(3)	brings reflective and challenging learning experiences leading to a transformation of identity and practice
(4)	provides academics with different ways of identifying themselves as members of the community
(5)	brings academics opportunities to negotiate, feel ownership, give meaning to and shape the practice of the community
(6)	enables academics to envision possible futures and possible trajectories
(7)	brings possibilities of connecting local practices with the institutional and global practices
(8)	encourages active participation in which academics competently apply their learning in their own teaching environments
(9)	stimulates and motivates learning through the formulation, analysis and solutions of problems relevant to the academics' practice, profession, research, and passion
(10)	stimulates interaction and a sense of mutual responsibility for individual and group learning through group work and joint projects that create interdependencies among academics
Design for a learning environment in which	
(11)	perspectives, experiences and context of the academics are acknowledged and mutually respected
(12)	academics receive a sustained and ongoing support for learning
(13)	academics develop a positive attitude towards the learning experience through personal relevance and the connection to real and everyday needs

Table 8.1 Design principles

(1998) - the four dualities (participation/reification, designed/emergent, local/global, identification/negotiability) and modes of belonging (engagement, imagination and alignment) – see table 5.13, chapter 5. The set of guidelines were framed by theory and tested by practice, and are consistent with the conceptual design principles. The design guidelines help to make operational the conceptual design principles, making easier their implementation in the professional development environment.

Chapter 6 discussed how the design was enacted by the participating university teachers. Within the research cycle, some of the design guidelines were modified (chapter 6). Refinements of these

guidelines are discussed in this chapter. It is important to recall that according to the design-based research methodology (Design-Based Research Collective, 2003), the design principles should be tested and modified in several research cycles. In this sense, design-based research is based on a strong interdependence between research and design processes. The nature of design and its use in the learning process has a significant impact on the level of interdependence between design and research with respect to time. Depending on the nature of a learning activity, a design can be refined at the micro level -one month, one week or even one day- or at the macro level -one semester, one year or even more- (Bannan-Ritland, 2003; Cobb et al., 2003) .

Due to the long frame period of the intervention (10 months) and the relatively short period of the doctoral program (36 months), it was only possible in this study to make one macro-cycle iteration, consisting of one theory-driven design stage and one empirical refinement stage. This situation may limit the scope of the findings because refinement of the learning environment was made only at the micro-cycle level, and, as such, it was not possible to have a clearer demarcation between research and redesign stages. However, the inspiring idea of iteration and continuous micro-cycles of refinement was fundamental to understanding the development of new practices within the community, and the analysis of discrepancies between the intended design and the emerging use of it. These micro-cycles allowed the continuous modification of the educational intervention, which in turn promoted a more efficient learning process of the participants, as suggested by Sandoval (2004).

8.2 Modifying the Intervention Design

The guidelines were originally developed as a prototype solution that was based on the design principles, existing models and a literature review. A context in UNA was used to test and refine the guidelines. Through the micro-cycles of research, some new or more specific design guidelines were integrated, which in turn changed the learning environment (see Table 8.2). The modifications emerged as a response to the teachers' feedback, participation and learning. The last two guidelines (#10 and #11) are a result of a retrospective analysis and as such they are not considered part of the micro-cycles of research. These two guidelines are presented as modifications to be considered in a future second macro-cycle of the study.

In the following, each modification made to the design is briefly explained. The modifications were understood by their contribution to the professional development process and to the building of the

community. Table 8.2 shows the modifications to the design, the initial design guidelines that were related with the modifications, the new emerging design guidelines, and their possible manifestation in a second macro-cycle of the educational intervention. It is worth to notice that the new design guidelines do not substitute the former guidelines but complement them.

#	Modifications to the design	Initial design guideline(s) relevant to the modification	New/refined or added design guideline (s)	Possible manifestation of the guideline into a second macro-cycle of the educational intervention
1	Develop social presence through synchronous spaces for socialization	Promote a climate of trust	• Use every possible space to develop social presence • Developing social presence from the beginning by developing relationships among participants	• Use of forums and chats for developing social presence as well as for developing understanding of the learning concepts • Use of face-to-face meetings for teachers get to know each other • Provide one-hour synchronous chat session each week to support socialization.
2	Share researcher's observations with the participants	Allow the emergence of new participant structures and learning agendas	• Promote an ongoing participatory co-design process of both the community and the professional development program	• Share preliminary findings with participants. • Create open channels to receive immediate feedback from participants. • Promote workshops on how to feed-back the findings to the participants
3	Promote facilitator immediacy	Promoting a climate of trust	• Building a sense of facilitator immediacy	• Building a sense of facilitator immediacy through continued presence on the online environment, and through availability by phone, email and other communication tools as Skype and MSN

#	Modifications to the design	Initial design guideline(s) relevant to the modification	New/refined or added design guideline (s)	Possible manifestation of the guideline into a second macro-cycle of the educational intervention
				• Allotted enough time within facilitator's workload.
4	Foster a culture of online communication	Promote collaboration, communication and dialogue as a means to develop understanding	• Foster a culture of online communication, learning and participation	• Inform teachers on how to communicate in an interactive online environment • Inform teachers on how to use discussion forums and chats, from a technical, communicational and educational perspective. • Consider the five-step model of Salmon (2004) to progressively develop a culture of online communication
5	Provide guidance and closer support to the group work	Provide opportunities for group work Provide scaffolding to teachers based on their strengths	• Online group work and online collaborative activities should be used after giving sufficient time for the development of technological competences, commitment, responsibility and accountability among members.	• Promote the use of roles, responsibilities or functions for collaborative work (project management). • The initial phase of the project, where the problem formulation is taking place, should be preferably carried-out in face-to-face modality, as well as a clear definition of roles. • Teach the teachers in how to use technological tools to support productive group work

#	Modifications to the design	Initial design guideline(s) relevant to the modification	New/refined or added design guideline (s)	Possible manifestation of the guideline into a second macro-cycle of the educational intervention
6	Fostering local networks	Provide opportunities for group work Foster among teachers a sense of mutual responsibility about learning Encourage sharing of stories, experiences, and collaboration with colleagues, expanding professional and personal networks	• Foster local sub-communities and the sense of community before to expand to broader communities.	• Promote local sub-communities. • Build social -networks inter-campuses which later support online interaction and increase social presence
7	Establish a rhythm for the community	Provide adequate time for participation, reflection and implementation Acceptance of varying degrees of commitment in carrying out the tasks	• Establish a predictable and productive rhythm for the community that respect individual and context differences	• Find a proper balance between teachers' daily tasks and professional development activities • Promote small and simple online collaborative activities among teachers with close scaffolding and increase complexity on the time
8	Find a balance between online and face-to-face activities.	-------	• Provide a blended approach where online activities are supported by offline activities, generating energy, engagement and the emergence of a community	• Make short transitions between face-to-face an online activities to give an opportunity of identification and negotiability to all members.

#	Modifications to the design	Initial design guideline(s) relevant to the modification	New/refined or added design guideline (s)	Possible manifestation of the guideline into a second macro-cycle of the educational intervention
9	Promote a scholarship of teaching approach	Provide opportunities for critical reflection Encourage a professional approach to teaching (reflection, inquiry, evaluation, documentation and communication) Encourage teachers to communicate their experiences with broader audiences (conferences, seminars)	-------	• Inform teachers on how to follow a professional approach to teaching • Provide teachers with guidelines to help them better understand, assess and document learning processes and students' outcome. • Promote a culture of critical reflection and discussion on colleagues' results. • Foster regional and international dissemination of teachers' results.
10	Offer support in how to combine ICT with new pedagogical approaches	Provide scaffolding to teachers based on their strengths	• Provide close scaffolding to teachers in how to effectively combine ICT with new pedagogical approaches	• Provide examples and tasks that help teachers to integrate ICT and content with student-centered approaches • Bring teachers exemplary models and more opportunities to exchange with experts.
11	Discuss and reflect on how to be a productive member of a community of practice	Provide opportunities for critical reflection Foster among teachers a sense of mutual responsibility about learning	• Provide opportunities to discuss, analyze and reflect on what means to be a productive member of community	• Reflection on responsibilities, roles and benefits in being a member of a community of practice • To spend sufficient time in building trust and connections among members • To foster a culture of sharing and collaborative work

Table 8.2 Modifications to the design and new design guidelines

Modification to the design #1: Developing social presence through synchronous spaces for socialization

Raising social presence was considered fundamental in this study. Research has acknowledged that social presence is one variable which contributes to building a sense of community between people at a distance (Rovai, 2000, 2002). Social presence could be defined, among other definitions, as the feeling that others are involved in the communication process (Whiteman, 2002). Then, in an online environment, the challenge is to facilitate the interpersonal contact with the participants. In UNAgora, given the geographic location of the participating teachers, the ability to establish interpersonal contact relied very much in electronic contact. The overall purpose for creating social presence in UNAgora was to create a level of comfort in which the university teachers felt at ease around the facilitator, the researcher and the other teachers, and as a result, as Leh (2001) and Rovai (2000) asserted, increased the chances of participation, flow of information, availability of support, sharing of experiences, commitment to community goals, and cooperation among members.

Building a culture of trust and establishing an appropriate balance of participation and contribution in the community -when many of the participants did not know each other-, was a challenge. The initial design considered diverse spaces for developing relationships between participants and in turn initiated social presence (co-located meetings and online activities, such as welcome messages, personal profiles, and sharing expectations and experiences). The design also considered a weekly chat space for the facilitator to solve doubts and give support. This chat was much visited, but most of the teachers used the space more for socialization than for asking questions related with contents or activities. It was clear that the teachers' need to have a place and time just to share ordinary things. Therefore, in finding a balance between socialization needs and the facilitator's support to learning, a new permanent chat was suggested, UNA-chat. However, due to the permanent nature of this chat space, a participation schedule was not associated with it, so the teachers entered the chat at varying times, making it difficult to find others with whom to share, and provoking frustration in some of them.

From this experience, we saw the need to (1) develop relationships among the participants from the beginning in order to foster participation, and in turn increase social presence in the online platform, and (2) use every possible space (chat, forums, blogs, wikis) to develop social presence and lessen the feeling of being alone and talking to themselves (see chapter 7).

Modification to the design #2: Share the researcher's observations with the participants

During the first weeks of the educational intervention and in response to interest expressed by some participating teachers on the perceptions of the researcher about the community , we decided to create a new space called "Informative Blackboard" where the researchers shared, in the form of preliminary reports, their perceptions on the community's learning and building process. Sharing these results with the participants had several purposes:

(1) Recognizing the central role of participants in the research study and avoid treating them as means to an end (Fernandez, Kodish, & Weijer, 2003).

(2) Contributing to the micro-cycles of refinement (Bannan-Ritland, 2003; Cobb et al., 2003) of the designed educational intervention based on the analysis of the different activities: Achievement of goals, levels of participation and interest that the activity provoked in teachers.

(3) Facilitating reflection among the members about their level of engagement and identification with the community.

(4) Providing information that contributed to a better understanding of the community and facilitating the definition of a community identity.

(5) Creating an ongoing process of validation of results based on feedback from participants.

Sharing results was also a signal for the university teachers about the openness and accessibility of the researcher. We wanted to invite them to participate actively in the design process, and as such during the period of the intervention, we shared four reports with teachers. Twenty-one teachers visited the discussion forum and likely read the reports, but only seven of them wrote a commentary. The relative low degree of active participation could reflect a low level of interest among participants about the interim results (in despite of their initial interest), or maybe the teachers did not expect to give their opinion about the researchers' findings or maybe they were too busy to read and participate in yet another discussion.

Although preparing interim results that might be comprehensive for the audience required considerable time, it was considered important and valuable to give back this information to the teachers, and in that sense foster a more participative and critical contribution to the design and in turn to their professional development experience. Furthermore,

according to Fernandez (2003), sharing research results with the participants had demonstrated some potential benefits, such as the central nature of the participants in the study; diminishing the chance that the participants might feel used; emphasizing the participants' contribution to the understanding of the phenomenon under study; and enhancing trust in the researchers and the research process.

For the next macro-cycle it is suggested to promote workshops on how to provide feed-back on findings to the participants. It is the hope that the workshops would facilitate a meaningful dialogue among university teachers and researchers.

Modification to the design #3: Promote facilitator immediacy

According to Mandernach and others (2006), establishing a positive climate in online environments may be more challenging due to the reliance of this setting on technologically mediated interaction rather than more personal human dynamics. Teachers participating in this study were separated by geographic location, many of them did not know each other, and some of them were working in isolated conditions, thus their ability to establish interpersonal contact with the other participants was greatly diminished because most of the contact was electronic. Furthermore, for many of them connecting with others through an online environment was a new social and learning situation. And also in some locations, the connections were rather slow, which made the electronic mediation challenging and time consuming.

Findings show that a very active facilitation was required to help establishing a culture of trust and participation among members. Facilitator/instructor presence has been considered a key element in online learning (Anderson, Rourke, Garrison, & Archer, 2001) and in the building of a community (Wenger et al., 2002). In the context of UNAgora, we understood the importance of building a sense of facilitator immediacy due to her significant role in establishing social presence for the community. Therefore, we encouraged participating teachers to use diverse channels of communication, such as MSN, Skype, email and telephone to ease their communication with the facilitator. The use of those means for communication that are usually integrated in many teachers' daily life contributed to support what Wenger and others (2009) call an experience of togetherness and connectedness. This was especially important for those teachers that expressed a feeling of isolation and detachment due to the lack of face-to-face time.

The immediacy of the facilitator, as also identified by Shea and others (2005), helped to improve teacher comfort and satisfaction with

the online experience. In UNAgora, the teachers always stressed the central role of the facilitator in highly motivating them to participate in community activities, and it was found that personal emails from the facilitator, online messages and emails helped show accessibility. However, build a strong sense of facilitator immediacy entails time from the facilitator. The facilitator of UNAgora was a highly motivated person but with a heavy workload. The institution allotted 10 hours per week within her workload to take the role of facilitator, but clearly this was not enough to accomplish all the tasks needed to facilitate professional development in teachers and at the same time have a strong social presence in the community.

Thus, to build a strong sense of facilitator immediacy it is suggested: (1) facilitators should have allotted enough time within their workload (at least 20 hours per week in the case of professional development communities); (2) build the sense of facilitator immediacy through availability by phone, email and other communication tools such as Skype and MSN, besides continued presence in the online environment.

Modification to the design #4: Foster a culture of online communication

Preparing teachers to deal with the needs and demands of an increasingly technological society was established as one of the challenges of professional development programs (Lawler & King, 2003). One of these new demands are that teachers should be competent in creating learning environments supported by ICT that provide greater access and flexibility (Price et al., 2005), and in turn change their roles, responsibilities, and the mechanisms through which they carry out their work (Crawford, 2008). We believe that in order to be capable of creating learning environments mediated by technology; university teachers should be familiar with blended and online learning. As such, we assume that teachers can learn to teach with technology by first learning to learn with technology.

Supporting quality discussion and dialogue is critical for the professional development process. Learning activities were set up to foster productive dialogue and learning and to promote conceptual and reflective thinking about the diverse conceptual topics. The design of the professional development process aimed to provide the teachers with opportunities to use the tools in the way their students would be asked to use them in a student-centered approach for learning (Gallant, 2000). However, many teachers in UNAgora were newcomers to the practice of online communication and online learning. In this respect,

during the intervention, the teachers were fostering - through dialogue and activities -, to take on their role as participants in an online learning process, to learn and establish productive dialogues through online communication and to see the physical meetings as complementary opportunities to share experiences and enhance knowledge.

Many teachers showed limited interaction regardless of their intention to do so and regardless of initial training in the use of the technological platform. Some of them expressed do not feel comfortable with online communication. When teachers did not accomplish the learning activities and did not interact with each other in the forums or chats, they miss an opportunity to develop conceptual understanding, and as such the potential of the professional development experiences diminishes.

This suggests that before teachers interact online significantly other conditions are necessary. In other words, it is not enough to train teachers in the use of the technological tools, rather it is necessary to foster a culture of online communication, learning and participation which can contribute to the development of quality discussion, social presence and the sense of community. However, this study also shows that developing a culture of online dialogue and learning is not an easy task. The findings suggest that, first, it is important to ensure that the expected skills of online communication are taught to the teachers from the beginning, and as the intervention progresses, more emphasis should be placed on making the teachers aware of the skills and procedures needed to ensure learning, discussion and dialogue. As technology obstacles are overcome, the focus should be placed on fostering a culture of online communication and community building.

In short, an attitude towards online communication should be cultured among the teachers, mainly with those teachers who brought with them educational and life experiences totally foreign to an online environment. This process of creating an online culture of communication may be approached through the five-step models of Salmon (2004):

- Step one: About motivation and success in accessing the online system.
- Step two: Involves individual participants establishing their online identities and then finding others with whom to interact and socialize
- Step three: Participants share relevant information with each other.
- Step four: Group discussions occur and the interaction becomes more collaborative. The communication

depends on the establishment of common understandings. Learners depend on each other's contributions to complete tasks.

- Step five: Participants look for more benefits from the system to help them achieve personal goals, explore how to integrate other forms of learning online and reflect on the learning processes

Each stage requires participants to master certain technical skills before reaching deeper levels of interaction. Participants learn through participation and engagement. The above five steps may be useful in developing a positive progression in the quality and intensity of the interaction between teachers and between teachers and the facilitator, and in this sense support both teachers' online learning and a progressive development of a culture of online communication.

Modification to the design #5: Provide guidance and closer support to the group work

The intervention discussed in this study draws on the pedagogical principles of POPP (Dirckinck-Holmfeld, 2002; Graaff & Kolmos, 2003) to establish mutual interdependences between participating teachers, and to increase the feeling of connection and community between the members. Joint projects and action learning are fundamental didactic principles in POPP and, as such, they were present in the design of the learning environment for teachers.

However, the group work, as explained in chapters six and seven, was not as productive as we envisioned. Guidelines to inform teachers how to organize the group work were provided, as well as guidelines in how to create the necessary spaces to establish communication and negotiation among group members; however statistics from Moodle indicated that some did not use those resources. The facilitator and the researcher provided extra support to the coordinators of the group through e-mail, phone, and chats. In spite of all the efforts, group members demonstrated a low level of interaction and were unable to define roles, to take decisions, and to accomplish all the learning tasks.

Provision of extra support did not help the groups carrying out all the activities or keeping the deadlines. The coordinators that were selected in each group were not successful in initiating group work at the deadlines given. In summary, group formation did not develop online. This suggests that either the used approaches for group work were not successful, or there are other factors that are keys to success. This study identified that factors as time, a sense of feeling comfortable interacting

online, and a commitment to the group were key reasons for encouraging some participants to go online and complete the activities.

Time is a difficult issue to manage in professional development programs, but in order to help teachers feel comfortable online and develops a commitment to the group work this study suggests a need for more emphasis on initial face-to-face social aspects so that afterwards the online group formation can take place. This is also in line with some studies (Fjuk & Dirckinck-Holmfeld, 1997) which emphasize face-to-face in the initial phase of the project, where the problem formulation is taking place.

The social interaction in the initial part of the professional development model is important. It should be designed to help teachers socialize and get to know each other, and to help them build social networks and a sense of community. It also should facilitate the problem formulation phase. In the initial design, it was stated that collaborative activities should be included to create interdependencies and to increase accountability, however, from the experience of UNAgora, it is concluded in most cases that technological expertise, commitment and responsibility must be present before online collaborative tasks can be carried out successfully.

Therefore, this study proposes that online group work and online collaborative activities should be used after giving sufficient time for the development of technological competences, commitment, responsibility and accountability among members. The initial phase of the project, where the problem formulation is taking place, should be preferably carried-out in face-to-face modality, as well as a clear definition of roles. In this sense, the online learning environment may effectively support collaborative project work.

Modification to the design #6: Fostering local networks

It was found that the active participation in the online environment was low for some teachers. Groups were set up during the course, but there was also insufficient interaction in them to be productive. Lack of interaction between group members online indicated the difficulty of developing social networks and accountability online, and it suggested the importance of using networks that have already been developed between the members of the same regional campus, that is, local networks.

Many teachers were found to prefer to work in local groups. In general, the teachers felt more accountable to those who were in the same campus. Thus, commitment and accountability to the group were

found to be prerequisites to collaborative learning as there needed to be interaction first before the teachers could contribute and make learning productive. Three of the five local networks worked very well, providing help and support in the development and implementation process of the teachers' pedagogical innovations. This suggested us the idea of sub-communities or nested communities (Suthers, Harada, Yukawa, & Lid, 2005; Wenger et al., 2002) - smaller sub-communities existing inside the larger community-. Among the members of these sub-communities, it was more likely to find a culture of shared meanings and practices, as well as a sense of accountability to each other. This is also in line with some studies (Suthers et al., 2005) which states that small co-located sub-communities are the unit that mediates between individual learning and community learning. The differences showed by the five sub-communities regarding group support and commitment to the development of the pedagogical innovation project, are also consistent with Dubé, et al. (2006) who found that there are many different kinds of communities, and what works in one of them will not necessarily work in another.

In short, the work in the sub-communities shows that there was a relationship between closeness, interaction and accountability. The teachers felt obligated to interact because there were other colleagues in their local social network that would need support. In addition, the teachers were more likely to engage in critical dialogue and explore personal issues when they felt safe, respected and understood by colleagues who they already knew and who supported them.

This finding suggests two issues: (1) it is important to foster local networks and the sense of sub-communities before to expand to the larger community; and (2) if we want to foster strong relationships between teachers from different local campuses, more attention should be paid to social aspects in the face-to-face environment at the beginning of the learning experience in order to build social inter-campus networks which later support online interaction and increase social presence. This suggestion is aligned with Hara and Kling (2002), in the sense of using online communication to strengthen existing co-located communities of practices.

Modification to the design #7: Establishing a predictable and productive rhythm for the community

Effective professional development must provide adequate time for participation, reflection and implementation (Lloyd & Cochrane, 2006). According to Caffarella and Zinn (1999), the institutional structures, such as availability of time, funding, and access to information and

technology might hinder the professional development of the teachers.

Usually, the work at the university places the teachers under heavy time and workload pressures. The teachers have multiple roles and are asked to work with a wide range of people in a number of different contexts (Eacute & Esteve, 2000). They can take, among others, the roles of subject teachers, researchers, evaluators, and in some cases, professional leadership roles, such as coordinators or group leaders. In addition, university teachers work with fixed time blocks. At UNA for example, their work is concentrated into two yearly periods of approximately 18 weeks. The first part of each period entails intensive subject preparation, setting new rules, working with new students and starting new topics, and the last part of each term is dominated by completing topics, evaluating projects, preparing exams, and reporting grades. Consequently, it is difficult to take time to participate in professional development activities. On the other hand, the normal expectation in a teacher professional development process is that all teachers will complete activities at the same time. However, as chapter 7 showed, there were wide differences in the way UNAgora teachers engaged in the learning tasks. This suggests that the approach needs to be flexible with respect to time.

From the experience of UNAgora, although the design considered the teachers' workload and their working conditions, it was clear that there was a need to find a balance between providing the time required for participation and reflection, and ensuring that learning tasks were made in time to allow the learning process to evolve. The pressure of time, and commitment to a range of academic and administrative tasks faced by the teachers, emerged as one of the most problematic aspects for participation in the learning activities (see chapter 7). During the project, the timeline for participating and completing the learning activities was progressively extended from 1-2 weeks to 2-3 weeks. However, it was clear that providing a short period of time, such as a week, to perform learning tasks produced a stressful situation for many teachers and many of them ended up not performing the tasks. On the other hand, providing longer periods of time, for example three weeks produced a decrease in the motivation of some members and a drop in the rhythm of the community. Although it depends on the kind of learning activity, two weeks for completing tasks seemed to make the approach more manageable for busy teachers, and helped them cope with the learning tasks and remain active in them for longer. This result is consistent with researchers (Bygholm & Dirckinck-Holmfeld, 1992; Wenger et al., 2002) who state that the rhythm of a community should maintain an anticipated level of engagement to sustain the vibrancy of the community, yet not be so fast-paced that it becomes unwieldy and

overwhelming in its intensity.

Following Wenger and others (2002), we agree that establishing a rhythm in a community of practice entails the coordination of a growing cycle of activities that allow members to regularly meet, negotiate and reflect. This rhythm should be predictable, so it sets an expectation around how and when to participate in the community, and it contributes to overcoming the inertia in the community. But also this rhythm should respect individual and context differences in a way that do not cause frustration and problems for the members of the community. Clearly, effective professional development requires time, and there are no easy answers to the issues of time and rhythm, however as Guskey (2003) establishes, it is clear that the time must be well organized, respect differences, and purposefully directed to achieve the learning outcomes.

Modification to the design #8: To find a balance between online and face-to-face activities

Adopting a community of practice perspective is to understand learning as the building of social relationships that bind people together in productive ways (Smith & Trayner, 2005). The development of depth conversations, dialogue, negotiation of meaning, and the development of relationships that are capable of supporting learning are important design goals of a professional development program with a perspective in communities of practice.

Barak et al. (2004) identified face-to-face and online communication as a "creative tension". They argue that handling this tension properly is central to learning, because usability issues, lack of technical skills or negative attitudes towards technology can inhibit communication and potentially hinder the learning process from the beginning. They also suggest that while community members gain skills and confidence in computer-mediated communication and begin to form part of a culture of online communication that would allow them to participate actively in the negotiation of meaning, it becomes more important to promote face-to-face encounters.

The design approach of this study included face-to-face interactions from the beginning to complement online activities. As Smith and Trayner (2005) say, each media, either face-to-face and online, is an opportunity for negotiation of meaning in different circumstances and as such they can both limit or enhance participation. In the UNAgora experience, for example, almost all teachers expressed satisfaction with face-to-face meetings, and those teachers who were

confident with the management of technology, did not experience difficulties in keeping up during the online activities. But those teachers that had trouble communicating online and were not so confident with the use of technology rarely contributed online.

Online participation was important for the professional development goals. The teachers drew on their own experience, readings and supporting resources to initially participate in the online discussions. Then, as they read the thoughts of other colleagues, they were challenged to think again in a reflexive way. This sharing of ideas was highly valued by the teachers and contributed to the knowledge base of the community. On the other hand, the face-to-face interactions, particularly in the nested local sub-communities, appear to have been important for helping peripheral teachers to participate in dialogue and discussion, and for supporting them in their participation in the wider UNAgora community. In general, the teachers found face-to-face meetings very valuable in building relationships.

The experience from UNAgora suggests either (1) to take a starting point in the online environment, but as soon the contextual conditions permit, to make a transition to face-to-face. This transition, in a short period of time, would give an opportunity to identify and negotiate with those members who were unable to fully participate in the online phase, and later on they would be more confident in moving back to the online space; or (2) to initiate face-to-face with emphasis on the creation of social relations that bind members together and help to motivate them getting into the online space to experience a new kind of communication. In this initial face-to face phase, it is also important to gradually begin to establish the group-work and to initiate the shared work of developing a problem formulation and a project plan. After this initial phase, online communication and collaboration over time might strengthen existing ties, and may contribute to keep the social presence necessary to build a community.

Thus, finding a thoughtful combination of face-to-face meetings and online activities that may generate energy and engagement and support the emergence of a community is one of the challenges of communities. The study confirms what literature says, a balance between face-to-face encounters and online communication has to be carefully designed, providing a blended approach where online activities are supported by offline activities, creating a vibrant rhythm for the community. Further, we suggest that at least initially, is important to make transitions between online and face-to-face media to give all teachers an opportunity to identify themselves with the community.

Modification to the design #9: Promote a scholarship of teaching approach

A scholarship of teaching approach means engagement with the existing knowledge on teaching and learning, self-reflection on teaching and learning in one's discipline, and public sharing of ideas about teaching and learning within the discipline (Martin, Benjamin, Prosser, & Trigwell, 1999) .

One of the goals of the intervention was to foster a scholarship of teaching approach among teachers. For this, we exposed the teachers to different perspectives on teaching and learning (student-centered approaches - such as POPP-, modalities of learning (blended, e-learning), concepts about technology enhanced learning, and so on). Furthermore, we fostered the participating teachers to have a systematic reflection on teaching and learning; to introduce changes in their practices (through their pedagogical innovations projects); to investigate those changes and student outcomes and to publish results through presentations within the university. All the activities had as a purpose to foster in teachers an approach of investigation towards their classroom practice, meaning to think about teaching practice and student learning as problems to be investigated, analyzed, and discussed. This is, according to Bass (1999), the most challenging issue in the scholarship of teaching approach.

The study also shows that providing UNAgora teachers with opportunities for critical reflection helped them to re-evaluate what they have learned and encouraged them to ponder and implement alternative approaches to teaching. This is line with Light and Calkins (2008) and Kember and Kwan (2000), who states that the approach to teaching is usually driven by the conception of teaching.

In implementing new approaches to teaching, what was notable in most cases, was that the decision to examine one aspect of their practice in a new way was not only a requirement of the study, but an activity undertaken by teachers with a deeper motivation. Part of their goals in experimenting with different approaches was to see whether they liked them and to see what they got from them. They were interested in answering questions such as "What is it?"; "What works?"; and, "What is possible?" Furthermore, some teachers were able to position themselves as agents of change through the transformation of curriculum and instruction that responds appropriately to students and UNA demands.

The aspect of encouraging a professional approach to teaching has a broader guideline; therefore it was difficult to refine it, especially because the study had only one macro-cycle. However, it is considered important to promote the fact that the scholarship of teaching might emerge as a practice of the community. From, UNAgora experience, it

seems necessary to:

- Provide teachers with guidelines to help them better understand, assess and document learning processes and students' outcome.
- Promote, among teachers, a culture of critical reflection and discussion on colleagues' results.
- Foster teachers to do the dissemination of results at regional, national or international levels and even in published or peer-reviewed form.

Modification to the design #10: Offer support on how to integrate content, pedagogy and ICT

A core part of the educational intervention was the design, implementation, evaluation and communication of a pedagogical innovation that the teachers made in their courses. For this innovation project, they were motivated to take point of departure in an educational problem they wanted to explore. Then, the goal was to address this problem through designing a learning environment which uses both a student-centered approach and technology in an innovative way. This activity offered the teachers a learning experience to engage and discover educational technology and apply it in consideration of pedagogical principles.

One of the theoretical frameworks that supports this study is the pedagogical approach POPP as an organizational model to create interdependencies among members of the community (Dirckinck-Holmfeld, 2002; Fjuk & Dirckinck-Holmfeld, 1997; Graaff & Kolmos, 2003), and as an exemplary model that would help the teachers to move towards models of learning with less focus on transmitting knowledge –following UNA's pedagogical model-. Content, pedagogy and technology were considered community resources to be negotiated and created.

In the original conception of the project, we envisioned that teachers defined the pedagogical innovation in a collaborative way; this made sense because we wanted to foster links and exchanges of experience between them. However, it soon became clear that the group work was not progressing; hence the pedagogical innovations became individual projects. While some pedagogical innovations were more related to pedagogy and to an understanding of the relationship between pedagogy and technology, there were others that seemed to remain more focused on ICT. While we asked the teachers to consider

the pedagogical problem of their innovations and POPP as a potential pedagogical approach, we found it important that the teachers pursued issues and gained capabilities in their preferred directions. Because of this, we always supported their original initiatives and were careful not to push their innovations in the direction that we would have preferred. We felt that it empowered the teachers in their own practices, and ultimately it was less a matter of using ICT or POPP on teaching but to see teaching as a form of research and experimentation.

Even though the teachers were more challenged by technology, the communicative and interactive nature of the technology (Price et al., 2005) was useful for them to understand its potential in supporting different kinds of interactions between them and their students, and consequently understand the potential of technology in favoring a movement towards models of learning with less focus on transmitting knowledge (Dirckinck-Holmfeld, 2002). However, in order to strengthen the pedagogical innovations projects a future design needs to bring stronger scaffolding in how to effectively combine ICT and content with new pedagogical approaches.

Therefore, we suggest bringing exemplary models and more opportunities to exchange with experts that would help the teachers to imagine and visualize possibilities of this integration in their disciplinary areas.

Modification to the design #11: Discuss and reflect on how to be a productive member of a community of practice

King (2003) asserts that the community of practice approach (Wenger, 1998) is more effective than isolated professional development initiatives. A community of practice needs a community of people who care about the domain, and who engage in a common practice. Participation in a community of practice involves action and connection, and involves a culture of sharing.

However, designing interaction as integral to the professional development model may not result in participation by everyone; other means or incentives may be required to achieve full participation in the community. Discussion and reflection on what it means to be a productive member of a community of practice, is considered important from UNAgora's experience.

At the last meeting in UNAgora, some teachers said that they would have participated more if they had known more clearly what it means to be a member of a community of practice. Thus, we believe that a better understanding of responsibilities, roles and benefits

may increase the teachers' motivation to participate in professional development activities. Likewise, spending more time in building trust and connections among members and fostering a culture of sharing and collaborative work may motivate the teachers to actively contribute in the negotiation of meanings, and as a result improve the quality of their experience and their learning in the professional development program.

Table 8.3 shows the final list of design guidelines that, according to this study, may be used for professional development programs whose goals are to promote and sustain transformation in teaching practices under the theoretical framework of communities of practice.

Dimension	Mode of belonging	Guidelines for implementation
Participation/ reification	Engagement	Facilitate a space to interact (physical and/or virtual)
		Provide opportunities for group work
		Provide occasions for applying skills, conceive solutions, and making decisions
		Support a free circulation of information
		Support the formulation and solutions of problems that engage energy, creativity and inventiveness
		Provide resources and artifacts that support competence
		Provide learning experiences to discover and apply educational technology
	Imagination	Offer activities to explore and try new things
		Provide problems in which resolution will give a feeling of competence in the educational setting
	Alignment	Provide opportunities to do something in concert with institutional initiatives
Designed/ emergent	Engagement	Define and contextualize the core concepts to be introduced in a way that connect with the teachers' interest and needs
		Introduce and discuss different pedagogical approaches to address teaching and learning processes
		Offer situations in which teachers actively take part in the generation of knowledge and can develop a sense of ownership in that production of knowledge
		Promote collaboration, communication and dialogue as a means to develop understanding
		Foster a culture of online communication, learning and participation
Dimension	Mode of belonging	Guidelines for implementation

		Foster among teachers a sense of mutual responsibility about learning
		Allow the emergence of new participant structures and learning agendas
		Promote an ongoing participatory co-design process of both, the community and the professional development program
		Provide adequate time for participation, reflection and implementation
		Establish a predictable and productive rhythm for the community
		Encourage sharing of stories, experiences, and collaboration with colleagues, expanding professional and personal networks
		Group work and online collaborative activities should be used after giving sufficient time for the development of technological competences, commitment, responsibility and accountability among members
		Foster local networks and the sense of community before expanding to broader communities
		Be timely, prolonged, ongoing and sustained
		Provide scaffolding to teachers based on their strengths
	Imagination	Offer open-ended situations to give teachers opportunities to explore and to be inventive
		Provide a blended approach where online activities are supported by offline activities, generating energy, engagement and the emergence of a community
		Provide close scaffolding to teachers in how to effectively combine ICT with new pedagogical approaches
	Alignment	Validate with teachers the concordance between their understanding of teaching-learning concepts and their classroom approaches
		Formulate, implement and evaluate educational projects aligned with institutional new policies
Local/ global	Engagement	Promote exchanges with experts
		Encourage teachers to communicate their experiences with broader audiences (conferences, seminars)
		Invite experts from other practices
		Open institutional spaces for teachers to influence institutional decisions and policies
		Provide teachers with opportunities to enhance their status within the learning community
Dimension	Mode of belonging	Guidelines for implementation

	Imagination	Enable teachers to adopt other perspectives outside of their own teaching practice
		Envision links between teachers' classroom practices and broader educational practices
	Alignment	Make shifts or changes in practices based on new knowledge
		Converge around a common vision
		Enforce new institutional policies or procedures
		Be in touch with a broader context –regional, national and international
		Remain tied to university reward systems
Identification/ negotiability	Engagement	Have an influence in curriculum organization and development of institutional processes
		Promoting a climate of trust
		Developing social presence from the beginning by developing relationships among participants
		Building a sense of facilitator immediacy
		Encourage teachers to take risks
		Provide a safe place to make errors and experiment
		Sustain motivation
		Be flexible
		Promote generational encounters
		Promote inter-regional campus encounters
	Imagination	Provide opportunities for critical reflection
		Provide opportunities to discuss, analyze and reflect on what it means to be a productive member of community
		Provide opportunities to envision possible futures trajectories
		Encourage teachers to see themselves as leaders of the transformation of teaching practices
	Alignment	Provide opportunities for critical reflection and action about institutional policies
		Provide opportunities to understand the reasons underlying institutional policies
		Support critical thinking over solutions and interpretations, especially by favoring different perspectives

Table 8.3 Final list of design guidelines

8.3 The Design from the Perspective of the Dualities

In this study, the design of a professional development environment for academics entails the provision of facilities to engage teachers in an active, collaborative program with a curriculum about enhancing teaching and learning with technology, and with frequent activities that provide a learning development, a scholarship of teaching approach, and a process of community building.

Wenger's conceptual architecture for learning (1998) provides a framework in which we can design a social learning space that affords the evolution of a community of practice. This framework is expressed in terms of four dualities and three modes of belonging which become analytical tools that can offer a better understanding of the process of design for a community (Barab et al., 2004).

The design explicated in this study entailed choices along each dimension, creating a space of possibilities to constitute a community-oriented learning environment for university teachers. This space is given by the way it addresses each dimension. The following sections analyze the design from this perspective.

8.3.1 Duality: Participation and Reification

According to Wenger (1998), design for practice is always distributed between participation and reification. Thus, this duality creates two kinds of affordances for negotiating meaning as it concerns the need of creating a balance between resources for learning (reification) and the activities that make use of those resources (participation). As Wenger (1998) states, the main focus in this duality is on the negotiation of meaning rather than on the transmission or acquisition of information.

In the context of this study, this dimension entailed bringing together a group of university teachers through online and physical spaces, and providing them with opportunities of participation and resources they may use in support of this participation. The teachers' participation in the project was voluntary although some teachers were encouraged by their deans/directors to participate.

The educational design of UNAgora relied on both participation and reification. The design followed new institutional policies about educational integration of ICT and the pedagogical model. As part of the design, there were a number of participant structures that allowed teachers to engage and develop a sense of belonging to the UNAgora community as they participated in online discussions, readings,

dialogues with experts, reflection processes, co-located meetings, group work, and pedagogical projects. In that sense, participation was expressed in a variety of forms, and the teachers negotiated their identity and membership through their diverse levels of participation in those activities.

In chapter 7, section 7.1, a detailed description about how was participation in the diverse activities in UNAgora was presented. From the data it can be seen that the structures of participation chosen in the design were both an incentive and a hindrance to participation. Most teachers showed a preference for co-located activities. They expressed a need for more face-to-face training especially on how to use the virtual learning environment. Most of the learning activities took place in the online environment where the teachers' participation was irregular. Among factors that diminished online participation were time, technical competences and the lack of a culture of online learning and communication, as well as a low bandwidth in some locations (see chapter 7, section 7.5).

As has also been identified by others (Barab et al., 2004) in online communities, almost all kinds of participation in UNAgora was at the same time a form of reification, since most of the conversations were textually mediated. But, in opposition to their findings (2004), the persistence and public nature of the communication did not seem to hinder the possibilities for communication and participation. No teacher expressed feelings of restriction due to this fact; however they did feel restricted by their competences about using the technical platform and the "highly developed interventions" of some participants (see chapter 7, section 7.5, part O11).

As part of the negotiation of meaning and the collaborative knowledge building process, the teachers reified core concepts such as innovation, student-centered approaches, roles of the technology in education, and the teachers' new roles and demands. In addition, they were asked to reify their learning process in terms of producing documents, conceptual maps, blogs, wikis, evaluation rubrics and videos. The most important and challenging reification made by the teachers was to design a pedagogical innovation. This reification was a central facility for supporting engagement, imagination and alignment. It allowed the teachers to create alternative teaching/learning scenarios, envisioning new trajectories and, in many cases, pushing their own boundaries. Through this experience, they had the opportunity to contribute beyond their engagement, having an effect in the teaching practices at their local campus and in the institutional teaching practices. The most relevant outcome of this learning activity was that most teachers turned themselves into reflective practitioners (Schön, 1983) with respect to

their teaching, so they began to question themselves about their practice and made a commitment to enhancing student-learning. This aspect is identified by Laurillard (2002) as an important step in the process of renewing teaching and learning models.

In terms of the design, we anticipated (chapter 5, section 5.2.1) two possible tensions in the process of negotiating meanings: (1) a tension between the teachers' previous experiences, values and beliefs about teaching and learning processes and the new concepts and approaches that were discussed within the community; (2) a tension provoked by tools, plans, procedures, schedules and the online learning environment as reification.

The first tension actually became an opportunity for the teachers to re-imagine and re-work their understanding of teaching and learning, adopting as a result a new set of values as members of a community who aim to innovate teaching practices. Most of the teachers felt satisfied with their learning process and envision an enriched teaching practice. The second tension was, to some extent, discussed in the preceding paragraphs (modification to the design #7). The pace of the activities was a permanent focus of negotiation in the community. The members had different workloads, interests and priorities, so what was appropriate and reasonable for some - was not for others. The priority of the study was to sustain a level of engagement that could afford collaborative knowledge building, thus we dealt with this tension establishing beforehand a rhythm for the community that allowed the teachers to regularly discuss, negotiate, reflect and gain a clear expectation around how and when to participate in the community. Even so, and in order not to be too rigid or too loose, the pace of activities was flexible enough to adjust to the conditions of the teachers but still careful not undermine the learning process.

In order to foster a transition from peripheral participation towards central participation an adequate balance is suggested between online and offline activities as well as the development of a culture of online communication among teachers (the design-modification #8 deals with this matter). The reification of the teachers' learning processes in an educational project seems highly satisfactory. This process required the full commitment of the teachers and the integration of their own knowledge and experiences, and in that sense, as has also been identified by Ollila and Simpson (2004), the teachers gained more opportunities for professional development than in other less demanding activities - such as readings. The implementation of the educational innovations had an impact on the identities of the teachers and their future trajectories and generally increased the knowledge of the community. The realization of these pedagogical innovations also gave meaning to the university's

strategic plans and policies.

Regarding the technical platform, Moodle was chosen to support the community's activities because it was the institutional learning management system (LMS) (see chapter 3). However, even though, after the learning curve, most teachers felt comfortable with the technical platform, we would suggest for the next macro-cycle of the intervention to analyze other platforms more oriented to social networks rather than oriented to courses and content, but with the facilities to promote individual and community learning, such as Elgg, WordPress MU+BuddyPress and Mahara (see chapter 8, section 8.2).

8.3.2 Duality: Designed and emergent

Wenger (1998) argues that a community cannot be designed; but he offers a conceptual and architectural framework for facilitating the development of a community of practice. This framework was adopted in accordance with Goodyear and others (2001) recommendations in this study to design tasks, spaces and organizations that enable university teachers to engage in dialogues, discussions, project work and negotiations. The resulting design is intentional, and aimed to offer teachers transformative experiences in the domain of teaching with ICT, providing members with clear and visible structures within which they can learn, foster changes in beliefs, knowledge, and habits of practice (Lloyd & Cochrane, 2006). In the design, the "community" becomes the context for both, organizing the learning experiences and manifesting the teachers' learning through an identity of participation (Wenger, 1998).

In the process of designing the community and the learning framework, there was always a negotiation between the theory and the practical concerns (institutional resources, policies and constraints). The theoretical frames (community of practice, POPP and teacher professional development) played a central role in the initial design (see chapter 5), they inspired the organization of the learning process (focusing on community building instead of individuals, open ended problems and action projects to support the teachers' engagement), and in the choice of activities and resources that would be made available to the teachers (online discussions, collaborative work, reflection, contact with international and national experts, self-evaluation, etc.).

During the intervention, there was a constant interplay between the theoretical ideas and the practical requirements for designing a situation viable in the UNA context. Furthermore, the chosen method for this investigation –design-based research- supports the recursive

movement between the theoretical ideas and the practical requirements. Dealing with institutional resources (mainly the facilitator's availability of time) as well as with the teachers' schedules, needs, expectations and their competences (technical and cultural) to communicate through technology, drove us to refine the design and revisit our understanding of the underlying theories. So, the need to continuously adjust the initial design (see previous section) naturally comes from the transformation of the learning environment as it was experimented for the teachers within the institutional context.

The design provided several structures of participation, for example, the readings allowed the teachers to explore new trends in education and new pedagogical models. Online discussions and tasks supported the negotiation and reflection. The development of an educational innovation project helped them to develop new skills, to refine their practice model, to coordinate group work, to self-assess, and to be aligned with desired institutional practices. The feedback from the facilitator and the contributions of the teachers contributed to the development of shared standards about best teaching practices, helping to increase the knowledge base of the community. Face-to-face meetings gave a sense of belonging to a group with common interests. On the other hand, other design decisions had negative consequences, for example the early group formation impacted negatively on the community cohesion; having focused too much on supporting the relationship between teacher and technology could have neglected teacher to teacher relationship. And even though Moodle as a platform is "easy" to use, it is not the most convenient platform to foster sociability, so in the process of adding more functionality, the learning space became more messy and complex and some teachers got lost.

The theoretical frameworks contributed to a deepening of the researcher's understanding of teacher professional development processes as they took place in an everyday institutional context. It also showed why change to a different perspective on professional development (from formal training to learning in practice) may be confronted by the institutional professional development practice, as the teachers might experience uncertainty and discomfort when we asked them to learn and communicate differently. The implementation of the design showed the commonalities and tensions between different perspectives (institution-UNA Virtual-, teachers and researchers). Sometimes the intentions, objectives, knowledge and constraints were aligned and sometimes not. For example, some of the tensions pointed out during the intervention were

- the researcher and facilitator expectations about teachers' participation in online activities versus actual

participation

- the open and informal character of learning in the community -that is unfamiliar to teachers-, compared to a formal institutional process that is more directed and structured
- how to find a balance between freedom and responsibility to participate in the learning activities and the institutional need to ensure the "acquisition" of new knowledge and skills by the participating teachers
- the length of the intervention (ten months),- deemed necessary for the formation of a community and for the teachers to design, implement and evaluate, in some depth, a pedagogical innovation- versus shorter or more directed modules, and
- to some extent, expectations of the researcher and facilitator for the integration of ICT and POPP versus educational innovations implemented by the teachers in their classrooms – which focused more on the inclusion of ICT than on explicit pedagogical changes.

Many of these concerns were brought by the facilitator to the community itself, allowing the community members to deal with the tensions. In this respect, the overall design aimed to provide a defined framework for learning and for community building. Throughout the intervention, and as it was presented in the previous section, the design promoted and/or hindered emerging variations responding to the teachers' responses. The way these variations were incorporated in the design also had an effect on their learning and community development.

According to Wenger (1998), "there is an inherent uncertainty between design and its realization in practice, since practice is not the result of design but rather a response to it" (p.233). In this study, the design and its realization in practice promoted a dialogue between theory and practical problems. The design as a process and the intervention as a product raised a greater awareness and understanding about teacher professional development processes. It was also learned that the design for a particular community of practice should consider the community and institutional structures already in place and how they influence the desired outcomes of the intervention. Capturing these influences would help to conceptualize what the design tries to generate and what can be

done in a specific context. In summary, it is possible to conclude that the design and facilitation of the learning environment was flexible enough – under certain institutional constraints- to allow emergent participant structures, teachers' learning agendas and participation norms, and in this way renegotiating the design.

8.3.3 Duality: Local and global

The local and global duality refers to how a community of practice relates with the rest of the world. It represents the fact that any community of practice should be able to link its local practices with global frameworks and have an influence over them (Brosnan & Burgess, 2003).

According to Sorcinelli et al. (2006), professional development must be aligned with the institutional mission and should promote institution-wide dialogues. The educational intervention object of this study was designed under the umbrella of UNA's new pedagogical model which is focused on a student-centered and lifelong learning approach; promotes the use of technology to facilitate interaction between teachers, students and learning contents; and conceptualizes teaching practice as a complex and multidirectional process oriented to reflection, participation, collaborative work and innovation (see chapter 3).

The new demands of the knowledge society and the globalization processes impose increasing expectations in teachers about their roles, responsibilities and ways to carry out their work (Crawford, 2008). The changing UNA institutional policies also demand new skills and roles. In that sense, it was expected that the design of the learning environment and the emergent community serve as a boundary object around which the teachers could negotiate their contribution to the institutional educational practices and their alignment to the new institutional efforts and policies.

Wenger states (1998) that a community of practice relates with the rest of the world, through creating continuities across boundaries, and this cross of boundaries can be achieved through (1) the use of boundary objects, such as artifacts, documents and concepts; (2) use of multi-membership –brokering- to make connections across communities, enable coordination, and open new possibilities for meaning; and (3) boundary encounters, such as meetings, conversations and visits. The intervention studied here, made use, to some extent, of the three types of opportunities to establish links between local and institutional practices.

The design encouraged the exchange of knowledge and experiences among teachers at two levels: locally in the same campus and globally with teachers from other regional campuses at UNA. Having university teachers from five different regional campuses and from many different areas of knowledge reading, reflecting and discussing about pedagogical approaches and innovative ways of teaching was a fertile ground to promote learning and critically explore beliefs and values about teaching and learning. The exchange of knowledgeability among teachers that came from different local communities promoted learning not only at the individual level but also for the whole community (Ollila & Simpson, 2004). The pedagogical innovations designed, implemented and evaluated by the teachers (in contexts, condition, targets group, and areas of knowledge different) were a boundary object that created continuities across boundaries (Wenger, 1998), and allowed the expanding of knowledge. They also enforced UNA's new policies about the use of ICT in teaching and about a new pedagogical model focused in a student-centered and lifelong learning approach.

The pedagogical innovation project, in addition to having local significance to each teacher, was a boundary object around which teachers from the same regional campus, shared, discussed, and supported each other. It was also relevant in the community as a concrete example of changes that teachers can make in their teaching. The teachers were able to see experiences of successful implementations, hence gaining evidence of improvements in students' motivation and participation. These successful experiences, have been identified by Guskey (2002), as experiences that contribute to changing the teachers' attitudes and beliefs. Even for teachers who did not implement the pedagogical innovations, the experience of their colleagues acted as a mirror of what works and what is possible. The meaning of those boundary objects were negotiated while the teachers shared their experiences, and they work as a source of imagination, giving those teachers a sense of possible new trajectories, where they can make changes in practices based on new knowledge and experiences.

The pedagogical innovation project was a bridge between the local practices and the institutional global processes of innovation. It enabled locally generated and situated knowledge to have an effect within the university. Through them, the institutional policies were understood by the teachers as relevant, in other words, the global reform agenda of UNA made sense and developed meaning and value to the teachers through their local experience with the pedagogical innovation. On the other hand, the experiences of the teachers also influenced institutional decisions and policies. UNA-Virtual had an advisory role within the strategic directions and initiatives of the University; it has the capacity

to translate emergent practices into policy and procedures either within its scope or within the university as a whole. Thus, all the experience of UNAgora adds to the base knowledge of the institution, and in that sense the teacher's local practice had global meaning. In the same respect, visits by teachers to the central campus were boundary encounters in which the teachers had negotiations and informal talks with the authorities of the UNA that contributed to establishing a reciprocal flow of information from local to global. However, the teachers asked for a broader university communication that would enable local authorities (Dean/Director) to better understand the importance of the community and to value the time the teachers invested in it.

Another way to expand local visions with global visions was through the contact with experts –national and international-. Exposure to professionals in action was considered essential for negotiating expertise. Guest speakers, informative conversations, and observations exposed the teachers to real world teaching practices. In particular for the POPP subject, the teachers had the opportunity to participate in a workshop lead by an international expert in the approach. These experiences were discussed in the online forums to deepen understanding related to the discourse and patterns of practice, and as such they were a vehicle through which the teachers developed shared standards and values around the studied subjects. Similarly, readings, discussions and reflection enabled the teachers to adopt other perspectives outside of their own teaching practice, envisioned links between their practices and broader educational practices.

Furthermore, the teachers were encouraged to communicate their experiences to a wider audience, - at first level within the community and, - at second level, five of them were invited to present their experiences in an institutional activity about innovation. In addition, two teachers presented a paper at a national conference organized by the university, and many other showed interest in sharing their experiences at international seminars and conferences.

There were also forms of multi-membership within the community that connected the local to the global. A number of teachers from each regional campus at UNA, with a variety of academic and professional backgrounds, participated in the project given, in this sense, coherence and continuity to the institutional initiatives. Some of the teachers are members of several communities and they work at more than one regional campus, including the central campus that has no participants in the project. The facilitator is also a member of several communities and she was an important link between institutional global reforms and the local contextualized practice of teachers – with all their limitations and constraints. This multi-membership allowed that both the teachers'

perspectives and UNA's perspectives were negotiated and balanced, so neither one was privileged or marginalized within the community.

According to Barab et al. (2004), the challenge in designing for a community with a focus on change is to create a balance between meeting the teachers' particular and immediate needs and a more global institutional change agenda. In the case of UNAgora, the institutional change agenda considers the introduction of ICT in teaching and learning process as well as the adoption of the new pedagogical model. In the project, it became clear that the teachers had a tendency to learn how to integrate technology – mainly the virtual classroom and web 2.0 social tools- rather than to explicitly change the pedagogical approach. However, we believe that technology brings opportunities to rethink teaching and learning and to change and reform practice (Dirckinck-Holmfeld, 2002; Price et al., 2005). Its effective use can promote a student-centered approach, in which students construct rather than receive knowledge, and teachers provide a framework that facilitates students' learning. When the teachers referred to their pedagogical innovation, they acknowledged this potential of technology and many of them adopted new roles. Thus, to some extent both the teachers' needs and expectations and UNA's agenda of change were met. It does not mean that there was no tension between the expectations of the institution and this study and, the teachers' constraints about what is possible or not for them to change and apply in their classrooms. We expected the UNAgora teachers to reflect on their current practices, and to learn and adopt new pedagogical approaches, and they felt overburdened attending 20-30 students per class, applying standards tests, fulfilling a content-based curriculum, and carrying-out several administrative tasks.

Nevertheless, this study supports Baek and Barak (2005) when they affirm that an online community model for learning creates the possibility of supporting a critical dialogue that integrates local practice and global reform agendas. In this respect, UNA may use a professional development approach as the one explored in this study as a way of achieving strategic goals. The community of practice orientation represents a model that may support long term structures and process changes within the university at the same time as they meet the needs of academics.

8.3.4 Duality: Identification and negotiability

One of the principles of effective professional development is to empower teachers to take control of their learning process, to transform their perspectives and to be able to contribute to the community's practices (Lawler & King, 2000; Lawler & King, 2003; Wing Lai et al.,

2006). In the context of this study, a group of university teachers was invited to be part of a community of practice that foster new teaching practices. The identification of teachers with the new teaching practices was considered fundamental to create the potential for learning and to achieve the goals of professional development.

According to Wenger (1998), this duality refers to the degree to which members identify with the community and the extent to which they are empowered to shape the community. Wenger states that the character of this dimension is different from the other three. While the previous three dimensions are related to questions of balance, in the dimension of identification and negotiability, the aspect of identification is a necessary condition for negotiability. In our context, this means that for teachers to be able to negotiate meanings and have an influence in the practices of the community, they first had to be able to identify themselves with the community.

The initial source of their identification with the community was the domain of the community itself. All teachers that accepted the invitation to be part of the community were eager to innovate their practice. They wanted to develop new knowledge and skills about how to integrate content, technology and pedagogy. In addition, the teachers acknowledged the potential value of bringing together teachers from different campuses with similar goals and interests. In this respect, the community offered an opportunity to envision possible futures trajectories within the university.

On the other hand, the cultivation of the distributed community of practice as part of a model for professional development was conceived by UNA-Virtual as a strategic and innovative initiative within the university. The participation in this strategic initiative (including the cross-campus collaboration) was powerful in framing the way the teachers perceived themselves and the way in which they perceived their practices and the changes they were able to make to those practices. The teachers were proud of belonging to the community; they considered themselves as pioneers and leaders who were contributing to changing institutional teaching practices.

Due to the distributed nature of UNAgora, we realized that having basic skills to deal with communication and learning mediated by technology was the first step to promote identification and participation. Thus, the design aimed to offer teachers opportunities of identification with the community through scaffolding them in the use of Moodle; promoting a climate of trust; providing a safe place to experiment and to make errors; allowing different levels of participation in the activities and being flexible enough to provide the teachers with the necessary

time to reflect and to appropriate the new practices. We wanted to create a "comfort zone" (Sorensen & Murchú, 2003) for all teachers involved, regardless of their experience with technology.

However, despite the high rate of initial identification with the community practices and our efforts to design a learning environment simple enough to allow participation, the teachers faced obstacles to sustain and increase over time their fields of identification (see chapter 7, section 7.5). The basic obstacle, as it was foreseen, was related to technology. The participating teachers had considerable differences in their experience with technology. Some teachers had had little contact with technology (just email and word processor), while others had even taken online courses. In spite of training sessions, the learning curve for many teachers was long, and this factor diminished their ability to sustain their initial identification with the community. There was also a cultural aspect that affected identification and, consequently, negotiation. As argued in the previous section, many UNAgora teachers were newcomers to the practice of online communication, and they did not feel fully comfortable participating in online learning activities. Thus, parallel to training the teachers in using technology tools, it was necessary to encourage a culture of online communication that enabled the teachers to feel comfortable with participating in new forms of learning activities.

Throughout the period of the intervention, it was clear that all teachers identified with the new practices fostered by the professional development program, but not necessarily with the structures of communication and learning proposed by the design. These structures were previously defined by the designers, so the teachers had limited opportunities for negotiation these. It is possible to conclude that the design was partially effective in promoting identification (see chapter 7, section 7.2). Some teachers with limitations in using technology did not have a chance to identify themselves with the enterprise and culture of the community. The identification was easier for more technologically literate teachers, and this fact can be seen in the identities built by the teachers and in their levels of participation. In summary, having basic skills to deal with communication and learning mediated by technology turned out mandatory in the distributed nature of UNAgora.

Ollila and Simpson (2004) state that the connection between professional development, identification and negotiability is strong. According to them, the members identify more with the community when they have more opportunities to negotiate its practice, and professional development occurs in this process of renegotiating practices. In the case of UNAgora, the renegotiation of practices was an ongoing process from the beginning. The objectives of many learning activities were focused

on enabling teachers to reflect on their current teaching practices and to envision, define and develop a new technologically enhanced teaching practice oriented towards student-centered approaches. However, not all teachers had the same levels of participation in the renegotiation process. Technical competences and lack of time were among the obstacles for participation (see chapter 7, section 7.5) for some teachers. Poor or little participation in the online activities provoked the perception of an inability to contribute to the community, and consequently their feelings of ownership over the community's enterprise were weak. Nevertheless, for some teachers, lack of participation in online activities did not affect their motivation to change their practices. They embraced the development of the pedagogical innovation project and were successful beyond participation in other community activities.

In conclusion, the design of the professional development model offered a scope for negotiation and identity formation within the community. The teachers assumed different levels of participation, and as also identified by Barab et al. (2004), the teachers closer to the center of the community were able to identify with and develop a feeling of belonging to the community to a greater extent that teachers with a peripheral role. However, both kinds of members were able to transform to some extent their teaching practices, and the quality of this transformation was not directly related with the level of participation in the online activities.

To the level of the community as a whole, the design promoted and distributed ownership of meaning through the development of the teachers' projects. They were originated in the campuses and grounded in problems identified by teachers in their courses. Discussions, meetings and work on analyzing and solving common problems created common ownership among the teachers. Engaging teachers from different campuses in joint activities contributed to promote multi-membership that transcended boundaries.

As a community, during the ten months of the intervention, UNAgora was in the process of defining its role within the university. It did not have a clear status within the institution and not many people out of its boundaries know about it. In fact, the community itself was modifying its field of negotiability within UNA. This aspect may also have made difficult the identification for some members. In turn, for other members to be the pioneers in UNAgora contributed to affirm their identity and their role in the framing of the community.

8.4 The Design from the Perspective of Modes of Belonging

To support the teachers' learning, we developed a professional development model based on the social learning principles of communities of practice (Wenger, 1998). This framework includes three infrastructures for learning: engagement, imagination, and alignment. Engagement addresses teachers' need to connect learning to prior experience, as well as to interact socially with others. Imagination entails the critical and reflective thinking processes that lead to questioning beliefs, envisioning alternatives, and transforming identity in response to new learning experiences. Alignment orients the learning process towards a common vision, solutions to shared problems, and contributions to broader contexts.

The design of UNAgora supported the teachers' identity formation through the three modes of belonging in various and diverse ways. Many participating teachers came to see themselves as innovative teachers in relation to (1) their experiences of learning and participation in UNAgora –many of the learning activities were delivered through online means-, and (2) their own designed, developed and implemented pedagogical innovation experience in the classroom. Being part of the community also contributed to alignment with the broader institutional context, since competency with technology and student-centered approaches is claimed by the institution as a desirable condition to be promoted in the academic career.

Much of what UNA's teachers know about teaching and learning approaches comes from their daily engagement in teaching. Through their experiences in the classroom and varying degrees of engagement with their teaching practice, their students, colleagues and institutional policies, each teacher sees himself, and is seen by others, as one who has a certain level of knowledge and competence about teaching. The teaching and learning approaches that teachers use in their classroom also contribute significantly to the development of their identities as university teachers. In this respect, engaging teachers in the community-oriented model of professional development proposed in this study contributed to the development of their identity as "innovative" university teachers. Within UNAgora, the teachers acquired a new discourse, and were able to develop their own teaching strategies to use in the classroom. They came to see themselves as competent members of a community engaged in innovative learning. Furthermore, when their ideas and argumentations were accepted in community discussions, other members also recognized them as "innovative teachers".

However, a small number of teachers (4 out of 18 who finished the

professional development process), did not engage in the activities of the community. They did not identify themselves with the professional development model - and its delivery mode -, and they did not have the opportunity to connect with the new topics and competences on a personal level. As a result, they were less likely recognized by others as teachers who are "innovative". Moreover, those teachers saw themselves as only marginally part of the UNAgora community, and perhaps failed to see themselves as competent in connection with the new teaching practices. It is important to notice that three of those teachers did not participate in the pedagogical innovation project. It means they did not design, implement and evaluate a pedagogical change in their classrooms. This fact contributed to the vision of themselves as peripheral participants rather than active ones.

Imagination, as a complement to engagement, allowed the teachers to build an image of the world and themselves, and to know that there are other teachers worldwide doing and trying the same things than them. Many of the UNAgora teachers were initially motivated to be part of the community by a process of imagination. They envisioned themselves as teachers with a new set of competences and knowledge and with a potentially new trajectory within the institutional context. As such, imagination was strongly linked with the initial teachers' disposition for learning.

Imagination has the advantage, unlike engagement, that it is not bounded by time and space (Wenger, 1998). Teachers do not need to physically see each other or do the same action at the same time as others to be able to imagine a new teaching practice. Being part of UNAgora gave the teachers an opportunity to reflect on their role within the university, thinking about themselves as collaborating colleagues, as researchers on their teaching practice, and as innovators. In some cases, they were surprised by their own abilities, and saw that they had much more to contribute with than they had initially expected. The retrospective reflection process allowed them to learn that it was valuable to change their practices, to share progress and difficulties with colleagues, and to take the time to assess the change from both points of view, theirs and the students.

In addition, the activities in the community in which the teachers chose to engage were often related to the way they envisioned those activities fitting into their broader teaching strategies. When asked to give reasons for their decisions regarding enrollment in the professional development process and participation in community activities, their responses (see chapter 7) revealed the ways they saw themselves in relation to future teaching practices and for some of them also as a means for developing new educational programs.

Alignment (Wenger, 1998) enables us to engage with others and care about how our engagement fits into a larger context. Participating in the community enabled the teachers to be conscious about how they fitted into UNA's new policies (pedagogical model and technology integration). To some extent, the UNAgora teachers aligned their energies with institutional boundaries and requirements. They considered integrating technology in their teaching practice as necessary for their academic career and directed their energy toward acquiring those competences. In that sense, being a practitioner in the community enabled both the ability to respond to their imagination as a new kind of teachers and to coordinate and connect their actions, viewpoints, and competencies into the broader institutional scope of teaching practice.

The three modes of belonging interact to form and develop identity. Currently, teachers at UNA are being motivated to learn new skills (pedagogical and technological). This contributes to building the identity of the teachers through alignment. As they participate in community professional development activities, their identity is further developed through engagement. In addition, the UNAgora teachers envisioned their learning within the community as necessary for innovating their teaching practice and as part of their academic careers. Thus, their identity as innovative teachers is built through imagination, engagement and alignment.

As part of the design, we chose learning activities that we felt would be most effective in addressing teachers' learning. The approach was noteworthy because it facilitated the development of knowledge and teaching strategies, and it enabled the building of the teachers' identities as innovators. In summary, the design contributed to developing identities as innovative teachers through the three modes of belonging:

(1) Through engagement, as the teachers participated in discussions, sharing, collaboration, and in projects where they were actively involved in the creation of new learning environments. The design and implementation of the pedagogical innovation project engaged the teachers in performing innovative teaching, making meaning, and generating their own solutions to educational problems they previously identified in their classroom.

(2) Through imagination, as they had contact with experts who shared with them experiences and ways to innovate teaching practices. In addition, we consistently reinforced the aspect that being innovative in teaching practice is valuable, that it can better support learning

for students, and that it is a better and more satisfactory experience for the university teachers.

(3) Through alignment, as the professional development process was aligned with institutional missions and values and we motivated teachers to have high expectations related to their practice. Most UNAgora teachers felt that they were contributing to the practices of the institution and that their efforts were valued and acknowledged by the university.

However while most teachers (14 out of 18 who finished the professional development process) developed expertise and new competences, others remained at the periphery after ten months, suggesting that time and readiness, among other factors (see chapter 7), are important in professional development initiatives oriented to learning in practice. It is worth noting that most teachers who remained in the periphery were those who did not participate in the development of the pedagogical innovation project. This confirms the importance of providing teachers with the opportunity to implement what they learned (Lawler & King, 2000), and with the opportunity to obtain evidence of improved learning outcomes of their students (Guskey, 1986, 2002).

8.5 The Design from a Teacher Point of View

Diverse aspects of the design were evaluated by the teachers as part of the two questionnaires handed out in June and November 2008. Both questionnaires were answered by twelve teachers. Table 8.4 shows the value obtained in each item that was evaluated.

From table 8.4, it appears that most of the teachers set their opinions, for each aspect, in the range of totally agree-agree. In June, more than 80% of the teachers found that the length of the professional development process was adequate, and this number rose to 100% in November. This may be because the teachers got a better understanding as the intervention progressed, that if one of the goals of the project was to build a community, sufficient time was required to get to know each other, to develop trust and to develop the sense of community.

With respect to the communication means and ICT tools used in the learning process, 80% of the teachers considered these appropriate. The remaining 20% may comprise those teachers who never felt entirely comfortable with online communication (see chapter 7).

In regarding the objectives, 83% of the teachers found that they

Aspect	Jun-08					Nov-08				
	5	4	3	2	1	5	4	3	2	1
The length of the professional development process is adequate	33.3	58.3	8.3	0.0	0.0	25.0	75.0	0.0	0.0	0.0
Communication means are appropriate and within your reach	41.7	50.0	8.3	0.0	0.0	25.0	58.3	16.7	0.0	0.0
ICT tools used in the learning process are appropriate and sufficient	41.7	41.7	16.7	0.0	0.0	25.0	58.3	8.3	8.3	0.0
The formulated objectives are achieved	25.0	58.3	16.7	0.0	0.0	25.0	58.3	16.7	0.0	0.0
Contents are relevant and of interest to my teaching practice	75.0	16.7	8.3	0.0	0.0	33.3	66.7	0.0	0.0	0.0
The contents are well organized regarding the formulated objectives	58.3	41.7	0.0	0.0	0.0	41.7	50.0	8.3	0.0	0.0
The proposed activities are consistent with the formulated objectives	50.0	50.0	0.0	0.0	0.0	41.7	33.3	16.7	8.3	0.0
The literature used is relevant and updated	50.0	41.7	8.3	0.0	0.0	41.7	50.0	8.3	0.0	0.0
The design encourages participation	33.3	33.3	25.0	8.3	0.0	25.0	58.3	8.3	8.3	0.0
The design promotes opportunities for socialization	16.7	41.7	33.3	8.3	0.0	58.3	33.3	8.3	0.0	0.0

Aspect	Jun-08					Nov-08				
	5	4	3	2	1	5	4	3	2	1
The design provides space for discussion of topics of interest	58.3	33.3	8.3	0.0	0.0	58.3	33.3	0.0	8.3	0.0
The design promotes and facilitates collaborative work	16.7	66.7	8.3	8.3	0.0	83.3	0.0	16.7	0.0	0.0
The resources and activities support and enrich the learning process	75.0	8.3	16.7	0.0	0.0	50.0	33.3	16.7	0.0	0.0
The pedagogical mediation supports teachers in their efforts to integrate ICT in teaching and learning processes	50.0	33.3	16.7	0.0	0.0	58.3	33.3	0.0	8.3	0.0
5 = totally agree 4= agree			3=disagree 2=totally disagree					1=NR		

Table 8.4. Teachers' evaluation of the design. June and November 2008

were accomplished. More than 90% of the teachers expressed that the contents were well organized in relation to the objectives and that they were relevant and interesting with regards to their teaching practice. The table shows that, in June, 100% of the teachers found that the learning activities in the community were consistent with the learning objectives, but this number decreased to 75% in November. This decrease may be related to the pedagogical innovation that was the main learning activity from August to November, and not all the teachers were able to carry this out. The item about the relevance of the literature did not change from June to November - just about 8% of teachers thought that it was not so relevant.

The next group of items is related to how the design promotes socialization, participation, reflection, discussion and collaborative work. About participation, in June 66% of the teachers expressed that

the design encouraged participation, and this value rose to 83% in November. The increase in this value may be responding to the work with the local sub-communities, where the teachers had more opportunities to meet face-to-face with their colleagues and share with them the progress of the pedagogical innovations. The same goes for the item on opportunities for socialization that went from 58% to 91%.

With regard to reflection, 91% of teachers said, in June, that the design provided opportunities for reflection; however this number decreased to 83% in November. This decrease is a little surprising because, in this period, the teachers were supposed to reflect on their classroom experience with the pedagogical innovation. A plausible explanation is that, in this period, as well as due to the implementation and evaluation of the pedagogical innovation, there were generally less activities on the virtual platform. In respect to providing space for the discussion of interesting topics, the value did not change from June to December. In both periods, 91% of the teachers agreed or totally agreed with the item.

The last item in this group refers to collaborative work. An 83% of the teachers in both periods confirmed (agree and totally agree) that the design promoted and facilitated collaboration. However, in June, 16.7% of the teachers totally agreed with the item and this number changed to 83.3% in November. Again the change in the value may be associated to the work with the local sub-communities.

The next item is related to the resources and activities, and whether these supported and enriched the teachers' learning process. In both periods, 83.3% of the teachers agreed with the item. However, the distribution of the values in both periods was quite different. While in June 75% of teachers totally agreed and 8.3% agreed with the aspect, in November 50% totally agreed and 33.3% agreed. My explanation for this decrease is related with the pedagogical innovation and with the inability of some teachers to perform this innovation. As explained before, the period from August to November focused on the development and implementation of the pedagogical innovation in classrooms, and those teachers that did not accomplish this task may have felt that the activities were not really supporting their learning process.

The last item has much to do with the facilitator and her role in the teachers' learning process. As it can be seen from table 8.4, in June 83% of teachers stated that the pedagogical mediation proposed by the design supported them in the process of integrating ICT in their teaching practice. This number rose to 91% in November, which confirms the important role that the facilitator had in fostering teachers to innovate their teaching practice.

Other aspects referring to the graphic design in Moodle and the navigational facilities that were provided in the virtual platform were also evaluated in both questionnaires. Table 8.5 shows the corresponding results.

91.7% of the teachers expressed that the design of the learning platform was friendly. In June, 83% thought that the graphic design promoted participation but this number decreased to 75% in November.

Aspect	Jun-08					Nov-08				
	5	4	3	2	1	5	4	3	2	1
The design is friendly	50.0	41.7	8.3	0.0	0.0	33.3	58.3	0.0	0.0	0.0
The graphic design invites participation	41.7	41.7	16.7	0.0	0.0	25.0	50.0	25.0	0.0	0.0
It's easy for me to navigate in the learning environment	41.7	25.0	33.3	0.0	0.0	66.7	25.0	0.0	0.0	8.3
It's easy for me to know which activities are assigned each week	83.3	8.3	8.3	0.0	0.0	83.3	16.7	0.0	0.0	0.0
I know where to find the information that I need to participate productively	50.0	41.7	8.3	0.0	0.0	50.0	50.0	0.0	0.0	0.0
5 = totally agree 4= agree			3=disagree 2=totally disagree					1=NR		

Table 8.5. Teachers' evaluation of the graphical design. June and November 2008

There is no explanation for this change in the teachers' perception because the graphic design did not change during the whole period of the intervention. The remaining three items showed an increase from June to November, and it is the normal expectation once teachers progressively feel comfortable with the online platform.

In summary, in average more than 80% of teachers perceived the design as one that facilitated learning, reflection, collaborative work and building of relationships. All of these factors have been identified

in the literature as key elements in teacher professional development programs (Crawford, 2008; Dede, 2006; Gallant, 2000; Lawler & King, 2001, 2003; Lloyd et al., 2005).

Summary

The focus of this chapter was the design itself. To some extent, it is an answer to the conceptual design explicated in chapter 5. As a point of departure, the design dealt with the principles of effective professional development in ICT, communities of practice and project-oriented problem pedagogy (chapter 2), and extracted the fundamental learning principles of the three complementary branches. Then, these learning principles were further elaborated in the form of guidelines that contributed to making the conceptual principles operational.

Through the progress of the intervention, and as the design was enacted by the participating teachers, a number of issues emerged which required further refinement in order to ensure that the ultimate goal of the study - university teachers' learning - could be achieved. These issues were explicated in the first section of the chapter, where the modifications made to the design during the ten months of the intervention were discussed.

The guidelines were used to develop a learning environment and refinements of the design guidelines were used to modify it as a response to the feedback of the participants. These modifications to the learning environment were introduced in chapter 6 (sections labeled: Learning from and for the design). Modifications from #1 to #9 were made throughout the ongoing professional development process and modification #10 and #11 are suggested for the next macro-cycle of the intervention (beyond the scope of this study).

Then, the design was analyzed on a more conceptual level from the point of view of Wenger's learning architecture (Wenger, 1998): the four dimensions (participation/reification, designed/emergent, local/global, identification/negotiability) and the three modes of belonging (engagement, imagination and alignment). The choices made within each of these dimensions contributed to create a space of possibilities for the learning environment.

The evaluation of the design from the perspectives of four dimensions showed that generally the design accomplished the expected goals of providing teachers with a productive learning environment. Even though there are a number of issues that require further work (they will be discussed in chapter 10), the findings show that the design appears to be robust, relevant and practical. It provided facilities to address the

basis for affording the evolution of a community of practice; it was able to open up to a new practice for university teachers through engagement, imagination and alignment; and it enabled the teachers to make sense of their experience of doing and learning within a community approach.

The teachers' learning was a response to the interaction between the intentional and the emergent design, and the design itself was a brokering activity that established connections between the requirements of the professional development curriculum, the teachers' needs, institutional policies, resources and constraints, and the new teaching practice we wished to foster. The findings suggest that the refined professional development program is a model of how professional development processes can be designed under the theoretical framework of communities of practice.

In the next chapter, I will draw on the findings to respond the research questions proposed in this study.

Chapter 9

Responding to the Research Questions

We know what we are, but know not what we may be.

William Shakespeare

Responding to the Research Questions

In this chapter, the findings from chapter 6 to 8 are discussed in the context of the research questions and the literature. The main research question of this study is

> *To what extent can a professional development framework based on the principles of communities of practice support a transformation of teaching practices in higher education, specifically regarding the introduction of ICT and POPP?*

Five sub-questions were used to help arriving at an answer to the overall question:

1. What is the impact of belonging to the community of practice on teachers?
2. What kind of changes takes place in the teachers' practice?
3. Which factors support or hinder the professional development of academics who are part of a distributed community of practice?
4. How does technology contribute (or not) to the formation of the community, and to the professional development process?
5. What principles may be used to guide the design of a professional development model-based on communities of practice for fostering change of practice?

This chapter should be understood as a complement to the previous three chapters. In chapter six, the history and evolution of the community was described; in chapter seven, the themes and sub-themes that emerged from the analysis were presented, as well as an analysis of the teachers' engagement and participation. In both chapters, the "voice" of the participants was offered as illustration and evidence of the matters discussed. Chapter 8 explored the design of the distributed community of practice approach to teacher professional development in relation to the design principles identified in chapter 5.

The approach of this chapter is to examine each of the five sub-questions, and then, in the next chapter, I will discuss the main research question in the light of the sub-questions and other considerations outlined in other parts of this study.

9.1. What is the impact of belonging to the community of practice on teachers?

The purpose of this section is to present data that answers the research sub-question, "What is the impact of belonging to the community of practice on teachers?" To answer this question, the research looked at how participants respond to the ongoing professional development process and looked at the feedback and comments they made in the online activities, reflection workshops and questionnaires.

University teachers are seeking changes to their practices that will result in positive changes in student learning and in their competences in dealing with ICT and student-centered pedagogical approaches. Several researchers (Barab et al., 2004; Buysse et al., 2005; Downes et al., 2002; Fischer et al., 2007; Gallant, 2000; Henderson, 2007; Jawitz, 2007; Lin et al., 2008; Lisewski, 2005; Lock, 2006; McDonald & Star, 2006; Pachler & Daly, 2006; Schlager & Fusco, 2004; Sherer et al., 2003; Sobrero & Gale, 2008; Warhurst, 2006; Wing Lai et al., 2006) have stated that communities of practices hold a potential to support change of practices. In the case of professional development, the community approach provides teachers with the opportunity to discuss change, to gather evidence of the effectiveness of changes and to receive feedback that will effect change more readily.

In this study, the design of a professional development environment entails the provision of facilities to enable and support the belonging of university teachers to a distributed community of practice. The point of departure of the study is the premise that engagement in social practice is the fundamental process by which we learn and become who we are (Wenger, 1998), hence becoming a member of an emerging *teaching focused on ICT collaborative pedagogies*- community of practice should be both a process of identity construction, and a process of competence acquisition.

Participation in a community of practice involves action and connection, as Wenger stated, it "combines doing, talking, thinking, feeling and belonging" (1998, p.56). In this regard, the participation of academics in the UNAgora community is seen as not just engagement in a set of activities, but as a process of being participant in a new teaching- learning practice and constructing an identity in relation to this practice.

The impact of belonging to the UNAgora community could be seen from several perspectives. In chapter 7, the benefits for teachers from participating in the community were described. The benefits that were identified are: knowledge and skills, sharing and advising, being an agent of change, reflection, co-construction of knowledge and connecting

with colleagues. Each benefit made a difference in teaching practice. In the following sections, I will summarize the impact of belonging to the community from two broader perspectives: learning and identity. The impact of membership on teaching practice is demonstrated by the data coming from the questionnaires, the online discourse, and the transcripts of co-located meetings, all of them presented in chapters 6 and 7.

Learning

A central conviction in communities of practice, is that learning is a social process that involves building connections: connections among what is being learned and what is important to the learner, connections among what is being learned and those situations in which it is applied, and connections among the learner and other learners with similar goals (Barab et al., 2004). The UNAgora community was seen as an opportunity to learn with and from colleagues and there was a growing understanding of the acquisition of new knowledge, skills and competences. Evidently the members were engaging in opportunities to learn, share and engage in professional discussions with their colleagues, as it was showed with many instances throughout the chapters 6 and 7. These opportunities were identified as valuable and, in some cases, as crucial for academics who work in remote locations and who do not have many opportunities to participate in professional learning activities as, for example, the cases of Nidia and Rosa (see chapter 7, section O8).

In spite of the barriers and difficulties described in chapter 7 (section 7.5), learning happens in many different ways in UNAgora. The description below provides a summary account of the competence development, and how their shared repertoire was extended during their participation in the UNAgora community.

Teachers learn to connect and share with others.

Lave and Wenger (Lave & Wenger, 1991) argue that professional development entails engagement, interactions and practice with others with similar professional interests. Data from chapters 6 and 7 show that UNA teachers have benefitted from working closer to their colleagues, especially those of the same regional campus. In some sub-communities, especially Liberia and Nicoya, they learned to work as a community, they engaged in supporting each other and in sharing expectations and experiences, enhancing collaboration in this way (see chapter 7, section B2 and B3). The academics expressed a desire for community and connection with other colleagues to share aspects of their teaching. Belonging was a strong emotional motivator and connecting with colleagues inter-campus-wise were valued as an opportunity to meet and

share perspectives with colleagues that they would otherwise probably never met. The community approach contributed to fostering a culture of sharing among teachers and provided knowledge networks for them. (Barab et al., 2001)

However, as Wenger also identified (Wenger, 1998), the relations were not always necessarily characterized by harmony and consensus. One situation that created tension among members occurred when they were negotiating a "lack of participation" in the community. The insights in chapters 6 and 7 showed that the core of more active teachers had different views about community involvement than the less active and peripheral ones. For example, there was a clear contrast between those who took part in the community activities within the planned period and those who completed their participation over a much longer time period or even did not participate at all. The latter expressed their problem as lack of time (chapter 7, O1); however the former firmly stated that the real problem was motivation (see Chapter 6, Section 6.2). They expressed that with sufficient motivation, participation is always possible. This negotiation created significant tension in the community, because some teachers were unwilling to admit lack of motivation as a reason for not participating. This could be seen by them as an "unprofessional" justification for their lack of commitment

Teachers developed their shared repertoire.

Teachers developed their shared repertoire in discussing with each other about new pedagogical approaches, new modalities of learning, the UNA pedagogical model, use of ICT to enhance learning, their role as teachers, and even their role as members of the community. The teachers in this study are all university teachers that work in the same institution. They belong to an overarching community of practice before joining the professional development model and started their learning process already belonging to overlapping boundary communities that have a lot in common. However, through participation in the academic discussions, the teachers were building and appropriating a shared, evolving pedagogic language affording the emergence of new pedagogic meanings. The disciplinary diversity of the participants within the community seemed to offer particular advantages in generating new understandings of pedagogic-supported-by-technology meaning, as well as values and goals for their professional learning.

Teachers engaged in reflective practice at a range of levels.

Literature suggests (Cranton & King, 2003; Layne et al., 2004; Smyth, 2003) that providing teachers with opportunities to explore, discuss and reflect about their teaching conceptions and practice,

enabled them to become less resistant towards different pedagogical approaches.

The teachers in this approach were required to think and act, in some depth, about their teaching over a 10 months' timeframe. This is a much longer period than the professional development processes normally experienced by teachers, and it is considered, as also identified by Gallant (Gallant, 2000), that this longer period of engagement contributed to creating continuity in the teachers' learning process through an ongoing, incremental, and cumulative process. Data reported in chapters 6 and 7 show that the community of practice approach could get teachers to think in-depth, ask and answer questions, and debate issues in ways that examine underpinning reasons, purposes and assumptions both of curriculum change and of their own attitudes and beliefs about teaching. Whereas certain teachers' reflections were restricted to affirmations of established practice, most were critically reflective in theoretically informed ways. Reflective learning at this latter level enabled the re-conceptualization and transformation of practice (Gibbs & Coffey, 2004; Light & Calkins, 2008; Smyth, 2003).

Teachers learned new ways of communication.

The UNA teachers learned how online communication works; they experienced synchronous and asynchronous communicative methods, and then applied these methods with their students. Before beginning the professional development program, just 30% of the teachers had previous experience with online learning. At the end of the study, most of the teachers felt confident in using and participating in online environments (see chapter 7, section ICT competences). It does not mean that all teachers were fully comfortable with online learning and communication (see section 7.5, O9). As it was explained in the previous three chapters, online communication in professional development processes is an issue which requires further study.

They learned about new teaching methods.

According to the UNA teachers, enabling and enhancing students' learning is the key value of their professional development activities. The realization of this aspect of identity can be evidenced by their extensive discussions about learner-centered teaching approaches (POPP). These approaches contrasted with the teacher-centered pedagogies which generally characterized teaching across the disciplines at UNA. Furthermore, it was proven through the study that learner-centered approaches required considerably more engagement with understanding student learning and more commitment to ensuring that students learn effectively. This commitment was manifest in a number

of ways through the pedagogical innovation. From the conversations in the discussion forums, it can be concluded that there were high levels of professionalism among the teachers when they discussed alternative approaches and their practicability within the institutional context. Furthermore, some of them (Pablo and Nidia) had applied problem and project-based learning methods in their pedagogical innovations, which gave them a broader perspective about pedagogical approaches.

Teachers acquired new technological competences.

In regarding technology, the teachers learned and used several tools (forums, blogs, wikis, chat, and video) to a greater extent. There was a general understanding of using ICT as a pedagogical tool that can improve learning and change how learning occurs. Moreover, the teachers learned and experienced that introducing ICT to change pedagogy entails a consideration of institutional organization, infrastructure and policies (see chapter 7, section B1, part "Organizing curriculum with ICT").

They got a better understanding of the students' expectations.

The teachers also learned and were surprised about the students' response to changes in teaching methods. At the beginning of the study, as it was explained in chapter 7, section B6, the teachers were almost convinced that they would need to face a negative, or at least not positive reaction to changes introduced in the traditional approach to learning. However, at the end of the study, all the teachers who implemented and evaluated the pedagogical innovation, realized the very positive response from students, and this response encouraged and motivated them to continue innovating.

Teachers experienced the desired learning as students.

Lawler and King (2001) indicate that when teachers take ownership of their learning, they increase the degree of establishing personal connections with the concepts, teaching methods and processes. The UNA teachers experienced the technology-supported pedagogical approach as students and, through a process of reflective thinking; they were able to draw out personal insight and understanding. The important issue is that learning was experienced rather than taught, and through their experience from UNAgora, the boundaries between themselves as learners and teachers were sometimes blurred. This may indicate that what is learned through experience is what is understood and owned in relation to themselves as teachers. When the UNA teachers experienced the new teaching approach in a reflective way, they had a personal vision of what the pedagogical approach looks like. This is aligned with Gallant's principle of constructive activity (Gallant, 2000), which states

that in order to increase the opportunities for change, the academics should experience the teaching and learning conditions they planned to create for their own students.

However, it is important to bear in mind that the experience of new or different approaches is not sufficient to bring change in the teachers' default approach to teaching and learning. As research reveals (Laurillard, 2002; Light & Calkins, 2008; Schön, 1983), such experience needs to be engaged through critical reflection on practice and in practice. Here is where the community of practice approach turns out to be fundamental in promoting reflective practice and support teachers in periods of uncertainty when they may face unfamiliar teaching and learning processes. To some extent, the community approach may decrease the risk of the academics returning to what is familiar to them and continue with their former practices (Layne et al., 2004).

Teachers transferred their knowledge in practice.

The literature points to the importance of providing opportunities to implement what is learned (Gallant, 2000; King, 2003; Lawler & King, 2000). As a further strategy for integrating knowing, acting and being, each participant designed, implemented and evaluated a pedagogical innovation to enhance some aspect of their educational practice. So, the participants were challenged to transform their ways of being university teachers through transforming their knowing and acting (Dall' Alba, 2005). The UNAgora community favored the development of expertise in teachers, which in turn was transferred to the classroom and had an effect on teaching and learning processes. The effectiveness of this form of learning was evident by the results from the workshop#3 and the last co-located meeting (chapter 6) where the teachers provided evidence of how the learning in the community had impacted on their classrooms. This conclusion is further supported by the final questionnaire where 92% of the teachers asserted that the professional development model allowed them to improve teaching practice.

Teachers used a professional approach in transforming their practice.

The teachers were involved in a learning experience closer to a *scholarship of teaching* (Laurillard, 2002; Trigwell et al., 2000), when they were required to reflect, inquire, evaluate, document and communicate theirs and students' experiences as part of the pedagogical innovation. According to Trigwell *et al.* (2000), there are five different levels on which teachers may engage in the scholarship of teaching: (1) knowing the literature on teaching and learning, (2) applying the literature on teaching and learning to improve their own teaching practice, (3) researching their own teaching and their students' learning

to improve their students' learning, (4) relating discipline-based literature to teaching and learning literature to improve their students' learning, and (5) communicating the results of their research to a larger audience to generally improve students' learning. During the study, the teachers who implemented the pedagogical innovation in their classroom had the opportunity to go through all the five steps, but with varied levels of depth, depending on factors such as: their educational background, their motivation to change practice, their understanding of the pedagogical approaches, their investment in reflective practice and their openness to communicate their own experiences.

The findings of the study indicate that one consequence of using a professional approach is that the UNA teachers shifted from a dependent attitude towards a personal and unique ownership of learning. Their initial attitudes to teaching are reframed in terms of professional responsibility and accountability as internal motivation for learning and engagement with their re-designed courses. Another consequence of using a professional approach is the predominance of a reflective stance towards their teaching practice and their professional development process, as well as further dissemination of the knowledge generated within the UNAgora community.

In summary, UNAgora provided the university teachers with the necessary social interaction environment for collegial learning and dialogue. In this environment, the teachers reflected and negotiated meaning and practices. For Lave and Wenger (1991), becoming knowledgeable in a practice entails learning to talk within and about practice. The teachers' interaction allowed different perspectives on topics and issues covered. In most cases, it appeared that the teachers' thinking and practice did, indeed, change. The data shows that their teaching practices improved through analysis and reflection, allowing the exchange of tacit knowledge and creating shared knowledge from individual and collective experiences. Hence, even though the teachers faced obstacles, they learned as a response to participating in UNAgora, what can be considered as significant and meaningful learning for the development of their competences.

Identity

Learning is a process that changes people. As Wenger (1998) stated, the central issue in learning is becoming a practitioner, not learning about practice. A key outcome of learning, in the context of social learning, is a way of being, of being a type of person in a specific practice context, it is a process of reconstructing identity (Warhurst, 2006).

In UNAgora, the university teachers participated voluntarily. In joining the community they were willing to interact regularly to learn how to improve their teaching practice. As they participated, they became more knowledgeable of the practice, learned new concepts and acquired new language and skills. Through engaging in the activities, and contributing to the practice of the community, the teachers developed their identities.

Participation in a new practice gave the UNA teachers identities as practitioners in that practice. Through their participation, as they learned and negotiated meanings about the core concept (student-centered pedagogical approaches, ICT as a tool to enhance learning), the university teachers gradually shifted from the periphery of the practice to the establishment of an identity in the core of the community. And this shift could come from different places in the periphery and had a different trajectory towards the center of the community, as it is illustrated by the following cases of Laura and Viviana.

There are many instances in chapter 6 and 7 that support the teachers' change of identity as results of their participation in the community. For example, Laura said that after being in UNAgora she is not the same teacher than before. Learning changed her identity. She comes from the Educational area and considered herself as someone who was not particularly good at handling ICT; however her identity was formed as an experience of negotiating her participation as well as reifying herself. Laura acknowledged her change of identity and said that even she was only involved in the community in a limited way (see data in chapter 7). She learned and experimented with innovative ways of using ICT in a pedagogical framework. This experience has changed her trajectory as an educator; moving her from a "regular" teacher to an "innovative" teacher who uses technology to enhance learning.

Viviana's learning process is another example. She graduated from Informatics, and her expectations for joining the community, in opposition to Laura, were to learn about pedagogy. Her identity in the community is a negotiated experience involving participation and reification. She had a steady participation in discussions, meetings and tasks (see data in chapter 7). For her, the community gave the power that enabled her to participate in a pedagogical practice in a new way. Furthermore, being a member of the community motivated her to embrace new learning and membership trajectories (she enrolled in a master program about educational technology).

Most of the participant teachers created a new image of their practice and of themselves. An example is Nidia, who imagines a future practice where she can combine the virtual classroom with

other platforms more popular among students, such as Hi5, YouTube and mobile phones. As Wenger (1998) said, imagining a different way of doing things is a matter of identity transformation as a learned experience of agency, since it changes the ability to act as agents.

Silvia and Lorena also transformed their identities; from being fearful about handling ICT, to being empowered to help others to transform their teaching practices. They reified themselves and were reified by others within their campus, as agents of change, with the task to help others in the process of innovating their practices with ICT (chapter 7, B5). As such, they undertook the role of *brokers* (Wenger, 1998), establishing and promoting interaction and links between their sub-community and the larger UNAgora community of practice.

Laura, Viviana, Nidia, Silvia and Lorena, as well as Mario, Rosa and Javier, are examples of teachers with an *inbound trajectory* within the community (Wenger, 1998), meaning that as newcomers to the new practice, they have invested their identities in moving towards full participation in the future. They have developed competence and confidence in a professional practice more focused on ICT-collaborative pedagogies and socio-constructivist understandings of learning, and as such, they are on a trajectory from peripheral to core participation in the UNAgora community.

Wenger (1998), states that members define themselves by both the way in which they participate in their practice and by the way in which other members view their participation in the practice. Identity is thus, "a very complex interweaving of participative experiences and reificative projections" (p.151). This interweaving of participation and reificative projections can be illustrated by David and his identity inside UNAgora. He was the leading participant in the community (see tables 7.1 and 7.3), he greatly contributed to the repertoire and the identity of the community (he was the one who baptized the community UNAgora), and his engagement and commitment to the community was beyond doubt, entailing that he was reified by most of teachers as *the leader* and the *guy in charge*. David was a member with an *insider trajectory* in UNAgora, he was a full participant seeking new ways of defining new practices and in this process renegotiate his identity. However, his very central role, high powered contributions and strongly social presence in the community, was not always positive for global levels of participation. Some less confident and less active teachers expressed feelings of insecurity, inadequacy and self-doubt, and were uncomfortable being unable to keep up with the participation of David, which somehow damaged their overall level of community involvement (see chapter 7, parts O10 and O11).

Wenger (1998) asserts that in order to be competent, the members need to feel familiar with the territory of the community; being able to engage with others, and making use of and contributing to the development of the community's shared repertoire. In the beginning, most of the teachers were unfamiliar with the "territory" of the community UNAgora. The domain (ICT + POPP) was new for many of them, and in addition, the main communication channel was also new. As can be concluded from chapters 6 and 7, not all the members were able to fully engage with others (see chapter 7, parts O4 and O9). As newcomers to a new practice, they did not have the ability to engage with others. Some of them were lacking the necessary expertise to participate online and others did not feel comfortable with this type of participation. These factors undoubtedly affected the teachers' identity and their potential to contribute to the community and to the practice itself. Although most teachers were able to overcome, to some extent, some of these difficulties and eventually were able to negotiate meanings, they had the opportunity to participate in the change of practice. For other teachers, such as Allan, Nora, Elisa and Luis, online participation was a major obstacle for identification, participation, and for the negotiability of meanings in the community. They were members with a *peripheral trajectory* within UNAgora, they needed more time and competences to become full participants. However, in the cases of Elisa and Luis, their current level of access to the shared repertoire allowed them to contribute peripherally and this contribution also shaped their identities.

On the other hand, the experience of online communication also contributed to form the teachers' identities. They learned new norms, roles, values and practices, while experiencing new ways of communication and exploring future possibilities for these new forms of activity (Coto & Dirckinck-Holmfeld, 2008). As the teachers were learning a new way of teaching, they found themselves as beginners again (Diekelmann, Schuster, & Nosek, 1998). While they were exploring the online tools, they experienced a lack of physical presence in the online classroom, they were confronted with different demands as they were often utilizing unfamiliar technologies (McQuiggan, 2007). As they had to design a pedagogical intervention and communicate, connect, and engage with their students differently, they began to rethink their assumptions about teaching and learning (Jaffee, 2003), shaping a new identity as educators during the process.

To sum up, identity entails an integration of experience and its social interpretation. The identities of the university teachers had evolved through participation and non-participation in the UNAgora community. Individual identities of the teachers were affected by their

activity levels, their growing technology competences, and what was happening personally and professionally in their lives. The possibility to negotiate meaning increases the closer the individual is to the core of the community (Wenger, 1998). All the experiences that the teachers had contributed to their learning and to their construction of identity as they used what they had learned in sharing and negotiating meanings with colleagues, and placed that knowledge in a local context..

Collective identity was expressed by several community members when they identified with a larger group (see chapter 7, part M4). Belonging to the community allowed the teachers to have an impact on the institutional practice (see chapter 8). Within their identity trajectories, the academics discussed how they would like to continue professional development activities in order to keep transforming their practices. As a group, they were engaged in discussions around practice, and foresaw a possible change. They visualized a possible future where they viewed themselves in a new light which included learning new approaches and techniques for designing more meaningful learning environments for the students.

Learning through interaction in the community contributes to building the teachers' personal identity. Acquisitions of skills that can be transferred to classroom practice, as well as the sense of belonging to the community, contribute to increasing the teachers' self-confidence. Support and advice from colleagues enhanced the sense of belonging to the community and to the collective identity of the teachers, who felt as parts of a group of colleagues interested in innovating their teaching practice.

To conclude the answer to the first research question, the impact of membership on the teachers is complex, and the level of this impact may be different for each teacher depending on their levels of participation, engagement, identification and empowerment to negotiate and shape the practice. However, in general, the UNAgora community acted as a forum for teachers to seek feedback on the potential of change that would result in positive changes to student learning, as well as a resource for sharing knowledge, experiences and solving problems they encountered or foresaw. Belonging to the community helped the teachers to develop a sense of expertise as they participated in peer-to-peer learning and it contributed to a higher sense of professionalism. The UNAgora community contributed to the personal growth of the teachers (Lloyd & Cochrane, 2006; Lloyd et al., 2005), because it contributed to increasing the teachers' personal skills, to enhance their status as innovative teachers within the university community, and to support reflection processes that enabled the teachers to take responsibility for their own learning.

The community of practice approach fostered a culture of sharing among the teachers and provided knowledge networks for them while they reflected on beliefs and practices (Barab et al., 2001). Being part of the UNAgora community enabled the UNA teachers to articulate their understandings about different problems, and to examine them from multiple perspectives. The learning that took place in UNAgora was oriented to the transformation of the teachers' identity within the practice. During and after their participation in UNAgora, the teachers followed different identity trajectories in relation to their change of practice. The findings presented in this section are consistent with the literature about how communities of practice can help change teaching practices and strategies, supporting the teachers' change of beliefs and attitudes towards teaching, at the same time as they facilitate knowledge creation and sharing of best practices. As some authors say (Wing Lai et al., 2006), the conceptual conception of communities of practice change the role of teachers to co-learners, facilitating identity building and reducing teacher isolation.

9.2. What kind of changes takes place in the teachers' practice?

As presented in section 2.1.2, professional development means more than development of skills. In our knowledge society, it is clear that professional development needs to engage university teachers in change of beliefs, principles and pedagogy (Gibbs & Coffey, 2004; Kember & Kwan, 2000; Light & Calkins, 2008; Putnam & Borko, 2000; Smyth, 2003).

While the previous research question focused on the benefits gained by the teachers in belonging to the community of practice, this question is targeted specifically at analyzing the type of changes that took place in the teachers' practice and the features that mainly afford this change.

According to Zabalza (2004), good innovations must lead to three levels of changes: changes in things, changes in people, and changes in the institution. He states that innovations include new forms of thought and action, new resources and new organizational structures. But this is not enough unless there is a change in people, especially in the teachers and in the training of the institutional staff. Innovation is about thinking differently, to value differently what is being done, to extend professional perspectives and to have knowledge about processes and attitudes

Evidence presented in chapters 6 to 8 suggests that the community approach to teacher professional development challenged

the participating teachers, and extended their understanding of key concepts of values and perspectives about teaching practice. The contributions to discussions and the implementation of the pedagogical innovation project reported in chapters 6 and 7 provide evidence about how much knowledge the teachers gained and the extent to which this had changed their thinking and practice.

The pedagogical innovation projects carried out by the teachers are also strong evidence that many of them were able to develop and use a much wider range of teaching strategies, including ones supported by technology and ones with a problem-solving focus. In the discussion forums, there were numerous occasions throughout the whole process when the teachers expressed satisfaction with the range of thoughts, ideas and strategies reported by their colleagues. Workshops and written questionnaire responses were strongly positive about the value of the sharing of ideas and learning activities within the study. Similarly, the comments expressed about the community of practice approach to professional learning highlighted the importance of sharing experiences and practical knowledge.

Some teachers felt their pedagogy had changed, others mentioned new activities and strategies they had adopted, and all of them spoke of an increased confidence in working with technology and with new pedagogical approaches. They considered technology as providing interesting opportunities to reinforce their teaching repertoire.

Using Bateson's framework of learning levels (Bateson, 1972), we argue that the teachers were taken from learning level I, passing through learning level II, and closely approaching learning level III.

Level I is a learning of facts, following the transfer of knowledge and information, which Paulo Freire (1970) called the banking model. It is the basic learning of subject matter, based on the knowledge received. As it has been explicated elsewhere, the UNAgora teachers acquired new knowledge and skills. For some of them, being in the community made the difference between knowing the existence of, for instance, the UNA pedagogical model, problem and project based learning, and web 2.0 tools, and having sufficient understanding to try them out. Furthermore, by the pedagogical innovation project – oriented to practical problem-solving situations-, the teachers in UNAgora were able to transfer what they learned in the community to the classroom, and during this process of transferring learned experience from one situation to another, the teachers learned to be more effective through self-evaluation of changes and gained awareness of how and why they used those new concepts, pedagogical approaches and technological tools. This is what Bateson calls learning level II. To some extent, it links theory with practice.

Level III is reflective learning (Brockbank & McGill, 2002). It has the ability to take a meta-view, not only about content but also about the learning process. The third-order learning involves discovering the ability to doubt the validity of previously-held perceptions. It offers opportunities for reconceptualization, change and development. The UNAgora teachers had the opportunity to approach learning at this level when they questioned the validity of their beliefs and values about teaching and learning; and when they felt compelled to change their role, behavior, and practice. Furthermore, the teachers' ability to contextualize their learning process into a new experience; their personal involvement in evaluating and documenting this new experience; and the opportunity to share and analyze it in a dialogue with other colleagues was another important component of reflection.

The teachers' pedagogical innovation projects were the most important reifications of their learning in the community; it represented their new ideas and values about teaching and learning. In addition, the teachers made some very positive reports on the impact of their pedagogical innovations, they especially refer to changes in motivation and in the learning culture in the classroom. Many teachers mentioned that they felt they had improved their teaching by making changes such as offering the students greater participation and voice in the learning process, focusing on learning processes and not only on products, moving the focus of learning from teachers to students, fostering a culture of greater collaboration and dialogue among the students, fostering a culture of critical thinking among the students, making learning more active, and listening to the views of the students on the topics of study and how they were planned, supported by technology and facilitated.

To some extent, the teachers also fostered learning levels beyond level I in their students. Rather than only presenting facts or taught skills, they made a shift towards greater student participation in the learning process, and greater student responsibility in working with the curriculum. To some extent, they moved students from a passive and non-critical way of learning towards questioning some of their more basic assumptions about the nature of learning and teaching. These, in turn, lead to a shift towards a more facilitative style and greater questioning of what is traditionally taken for granted in terms of university teaching practice.

It seems clear that traditional teaching methods are only adequate for promoting learning level I. Learning level II and III might require that the university teachers moved away from their role as transmitters to a new role as facilitators, where they - together with students- began to question the subject matter, the rationale for teaching it, and the better approach for learning it. On this basis, the teachers would encourage the

students to take responsibility for their own learning.

The results of the final reflection questionnaire, the reflection workshops, the dialogue and online discussion, and the results of the pedagogical innovation project all confirm that the approach influenced the thinking and practice of most participants. A number of aspects clearly assisted in deepening the level of thought and reflection of the participants.

What is found, in this study, to be the most important elements in promoting changes in teaching practices are: (1) the teacher's reflection on teaching and learning strategies; and (2) the positive experience gained by the teachers after implementing the pedagogical innovation project in the classrooms.

Reflection was found to have a number of benefits. The teachers reflected on the results of the practical problem-solving situations of their pedagogical innovation projects and, at the same time, on their learning process and personal development as well as increasing awareness of the teaching approaches they were using in the classrooms. The diversity of members in the community enriched and deepened the dialogue and individual and collective reflection. What is achieved is much more than learning a new fact (learning level I) or transfer of learned experience from one situation to another (learning level II), but a more general renewal of the teachers' beliefs. The university teachers approached Bateson's level III of learning, by the process of critical reflection on practice and on how their underlying assumptions were formed and on how they could change.

Guskey (2002) suggests that a significant change in attitudes and beliefs of teachers occurs mainly after obtaining evidence of improved learning outcomes of their students. These improvements are usually the result of changes that the teachers have made in their classroom practices, such as a new teaching approach, using new materials or programs, or simply a change in the classroom format. The crucial point for him is that it is not the professional development itself, but the experience of successfully implementing change which change the attitudes and beliefs of teachers. The teachers believe in the changes because they have seen how they work, and this positive experience shapes their attitudes and beliefs.

This model of change sustains change as primarily an experientially based learning process for teachers. Practices which are found helpful for teachers in helping students achieve desired learning outcomes are the practices that are preserved and repeated. Those that do not work or do not provide tangible evidence of success are often abandoned. In other words, the results showed in terms of student learning outcomes

are the keys to the permanence of any change in teaching practices.

In this study, the UNAgora teachers were mainly interested in changing students' behavior and attitudes to learning rather than changing curriculum or results from standardized examinations. They were looking to improve students' attendance, their involvement in class sessions, their classroom behavior, their motivation for learning, and their attitudes towards learning, the subject topics, and themselves. After implementing the pedagogical innovation project in the classrooms, all teachers succeeded in improving some of those student's attitudes. This evidence of positive experience was, as established by Guskey (1986), an important precedent for significant change in the attitudes and beliefs of most teachers. And, it was also an important element for teachers to overcome the uncertainty created by learning level III, and keeping them away from retreating back to their *comfort zone*.

The pedagogical innovation project contributed not only to changing the teachers' beliefs and attitudes, but to promote a new identity as innovative teachers. New identities were developed in relations with others, including students and colleagues inside and outside the community. However, not all UNAgora teachers developed an identity as innovative teachers, those who were not involved in transferring their learning into practice, failed to see them and be seen by others as innovative teachers.

The intervention designed in this study aimed at fostering changes in teaching practices mainly through integrating content to two components, project-oriented problem- based learning (POPP) and information and communication technology (ICT). The introduction of technology to support teaching and learning was a clear component in the pedagogical innovation projects, and it has been widely discussed in this and previous chapters. The POPP component is not so clear, so it needs further discussion.

The study envisioned that teachers in the community would be engaged in designing a collaborative pedagogical innovation where they applied knowledge about POPP to design technologically integrated learning activities in their subject area of teaching. The goal was to explore the relationships between technology, POPP pedagogy and content. However, we left the teachers to pursue their own motivation, and we were careful not to push their innovations in the direction that we would have preferred. At the end, we believed that empowering teachers to see their teaching as an ongoing field of innovation, experimentation and research was more productive than to stick with a pre-determined approach.

The analysis of the data from the online discussion forum and

from the pedagogical innovation projects designed by the teachers revealed that while the teachers had theoretical understandings of POPP, their project designs showed a strong tendency towards introducing technology, and the change towards constructivist pedagogical strategies was initiated more by technology than by a conscious and explicit use of POPP.

Data about online discussion forums indicated that they had a good theoretical understanding of POPP as a pedagogical approach. They were able to identify major characteristics of POPP such as authentic tasks, collaborative learning, student centered learning, and teachers as facilitators. Additionally, the teachers believed that the POPP pedagogy provided the students with several advantages including problem solving skills, critical thinking, collaborative learning skills, and transfer to real life problems. They also identified the potential obstacles to integrate the approach into the curriculum, and the institutional infrastructure required to support the effective use of the approach.

However, the pedagogical project designs showed that most teachers did not translate their beliefs and knowledge about POPP to create learning activities with integration of ICT components. Thus, while they were able to understand the importance of POPP and ICT integration, and how such a relationship could help students learn higher order skills, they were not fully committed to translate them into practice. Not surprisingly, time was the most critical factor for this result. The teachers stated that designing and implementing POPP and ICT is time consuming, and they felt more attracted by integrating ICT tools, so they decided to focus their innovation on technology rather than on POPP supported by technology. In addition, a number of teachers perceived that POPP may be more appropriate for master level students than for undergraduate students. Some teachers felt that creating meaningful authentic problems in their content area was a difficult task, and they were not sure about how to make problems interesting, authentic, and ill-structured.

The preference of the teachers towards integrating ICT rather than POPP may also be explicated by contextual factors. UNA has created policies and training options to foster the introduction of technology in teaching-learning processes. The result of integrating ICT in the curriculum is, to some extent, more visible than changing the pedagogical approach. Therefore, on the one hand the teachers feel a need and pressure to integrate ICT in learning activities and on the other hand, they also perceive that by the introduction of ICT, their efforts are most valued by the institution and their colleagues.

The results suggest that the teachers need to develop knowledge

that goes beyond technological competence. It is suggested for the next macro-cycle of the intervention to provide teachers with more opportunities for a deeper understanding regarding pedagogically sound technology integration. Also, as was suggested in the previous chapter, the teachers need exemplary models and more opportunities to exchange with experts that would help them imagine and visualize possibilities of this integration in their disciplinary areas. The professional development program should be structured in a way that allows the teachers to see and to experiment with the relationships between content, pedagogy, and technology.

The community of practice framework may facilitate the integration of content, pedagogy, and technology through facilities of engagement, imagination, and alignment. These facilities enable teachers to take part in the practice of the community, to learn about the practice, and simultaneously shape their identities. The teachers would share new knowledge, experiences, ideas, and competence –engagement-; they would extend their experience and practice through reflection and exploration with POPP+ICT –imagination-; and they would converge around institutional and community vision, goals, and practices –alignment-.

There are many approaches to promote change in teaching practice. The approaches followed in this study were more effective for some teachers than others, depending on factors as expectations, technical competences, and willingness to change. The UNAgora teachers went through a process of change, first developing a personal awareness of their beliefs and attitudes about teaching and learning; then learning about new pedagogical approaches and the potential of technology to enhance learning; articulating the process of innovation and collaboration, and finally expanding the scope of change to classrooms.

The stories of the changes presented in this study are more stories of personal change than institutional stories of change. The teachers have disseminated new approaches in the classroom and have changed their identities. UNAgora is a new way of approaching changes in teaching practice, and seems to have a potential to create positive changes both individually and institutionally. It is part of the premise that a community approach to personal development can be the stimulus for continued efforts to change an institution.

9.3. Which factors support or hinder the professional development of academics as part of a distributed community of practice?

This section reviews the study results that address the third sub-question, "Which factors support or hinder the professional development of academics as part of a distributed community of practice?" To answer this question, the researcher analyzed the comments from interviews, face-to-face meetings, reflection workshops, questionnaire comments, and online posts for evidence of motivating and demotivating factors that influenced participation in the learning activities proposed as part of the professional development program.

This study starts from three premises that professional development entails (1) engagement, interaction and practice with others with similar professional interests (Lave & Wenger, 1991); (2) a greater level of participation and engagement in the learning activities, and greater professional development opportunities for teachers (Ollila & Simpson, 2004; Tu, 2000); and (3) a community that supports its members to put knowledge into practice to increase the chances of transforming their practice (Schlager & Fusco, 2004).

In some way, the professional development model proposed in this study represents a multiple challenge for the teachers. To some extent, we are asking them to do things that most of them are not used to doing. First, we asked them to revisit their beliefs and values about teaching; second, we asked them to engage in student-centered approaches (POPP), third, we asked them to work collaboratively; and fourth, most of this collaborative work took place via online technology. In navigating through all these challenges, the teachers faced motivators and obstacles, which were presented in chapter seven.

Among the supporting factors or motivators for teachers belonging to the community, this study identified: establishment of new relations; a need for professional development; a desire of being part of something; and the teachers' personal engagement. The study also identified several factors as obstacles for the teachers' adherence to the community, such as time, overwhelming, afraid to change, group dynamics, online communication, over-participation, technical expertise, institutional technological infrastructure, institutional policies, geographical distance and non-participation. This section takes a more overall perspective in answering the research question. First, I will discuss the motivators and then the obstacles.

As showed in chapter six and seven, there were several reasons why the teachers engaged in the community and wide differences in the

way they engaged with and worked the learning activities. In general, the teachers' motivation to be part of the community and their commitment to professional development activities were related with a desire to be part of a group of teachers with similar interests, a desire to improve oneself, and expectations of improving teaching practice through acquiring a new set of knowledge and skills.

University teachers rarely receive sustained and deep training designed to help them to question their values, beliefs and attitudes about teaching. Furthermore, many professional development programs at the university level are delivered in the form of workshops or short courses which do not foster collegial relationships and collaborative work between the teachers, contributing to preserving the usually isolated and fragmented university structure (Carlson-Dakes & Sanders, 1998).

The domain of the UNAgora community was constructed around new teaching practices supported by technology and by student-centered pedagogical approaches, such as POPP. This domain established the common ground which gives university teachers the motivation to meet, learn, discuss, reflect and share; and, at the same time, it contributed to defining learning trajectories and the identities of the participant teachers (McDonald & Star, 2006). As members of UNAgora, the teachers showed commitment to the domain, and an interest in improving their practices within it.

The UNA teachers were motivated to be part of UNAgora by the idea of being part of something, and by the idea of sharing experiences with colleagues and discussing pedagogical and ICT aspects of teaching. There were also some teachers who were looking for a more inter-disciplinary conception of teaching work. This is, to some extent, opposite to the culture of individualism in the university environment that has been identified by some authors (Carlson-Dakes & Sanders, 1998). Being part of UNAgora (and its proposed professional development model) offered the teachers a different way to conceptualize teaching work. For many teachers, teaching is an isolated task and, in contrast, UNAgora offered them a space where they could interact with each other in new ways, learn from each other, question their assumptions about themselves and their students, and take new approaches to their teaching. In that sense, UNAgora provided a space for questioning and challenging institutional cultural norms about teaching.

Findings show that the cultivation of a culture of respectful dialogue where teachers can feel safe, confident and comfortable talking about their own practice and sharing it with others is essential to promoting a more serious and reflective dialogue.

The learning activities and discussions conducted within a

community orientation can create the space needed for progressive quality of reflective thinking. Initially, the teachers drew on reading and experience to make their initial entries. Then, as the teachers read the reflective and reflexive thoughts of other colleagues, they were challenged to think again, or to think in new ways. The results presented in chapters 6 and 7 show that this sharing of ideas, experiences and points of view was highly valued by the teachers, and seems to lead to a level of reflection and learning that many of the participants had not experienced in other forms of professional development. This result is similar to other researchers (Gibbs & Coffey, 2004; Light & Calkins, 2008; Smyth, 2003) who find that this type of reflection and knowledge sharing is a key to continuing professional development.

In addition to the connection with others, the teachers also showed interest in keeping track of a new information technology, new teaching methods and new assessment methods. These expectations fit into the new profile that is required of the university teacher (Zabalza, 2002). In general, the UNAgora teachers were strongly committed to their teaching. They believe they have evolved positively as teachers through the accumulation of experiences, but they feel the need to develop more active teaching methods which respond better to the students' interest and expectations. They consider the experience gained in UNAgora as an important contribution to their growing as a teacher.

Despite these positive aspects, it is clear that the teachers experienced problems, some of them arising from external sources. The obstacles that teachers in this study faced in the professional development process can be summarized in three broad categories: institutional structures, levels of engagement, and teacher' readiness.

Institutional structures

Within the institutional structures, this study identifies the following obstacles: lack of time, access to technology, and the tendency to individualism. The former two are also identified by Caffarela and Zinn (1999). The possibility of having time allotted for professional development within the teachers' workload, access to adequate technological infrastructure and a culture of collaborative work are considered necessary resources for the professional development model proposed by this study.

Many UNA teachers carry out management tasks in addition to their teaching and/or research tasks. These tasks, the difficulty in articulating their diverse personal and professional activities, and other extrinsic factors outside the control of the teachers, such as lack

of adequate technological infrastructure and lack of support from the authorities (mainly related with the time factor) contributed to hindering the professional development of the teachers. It was difficult for the teachers to take new initiatives and to develop new approaches in an institutional environment they felt did not fully support their needs.

In the same vein, it was also difficult for the teachers to be open to innovation when it required more work from them. In an agenda as overloaded as that of the UNAgora teachers, any changes that significantly altered the structure in terms of dedication and effort seemed to be of little importance. And this does not always happen due to lack of motivation, but for lack of conditions or personal hardship to alter the structure of priorities on which they were used to move.

In this study, lack of time seemed to be the main hindrance for the teachers' professional development. In general, the university teachers are busy people (meetings, research, commissions, reports, courses, conferences). For some of them, the problem may be more dramatic if they are part-time teachers or if they combine some lessons with other professional activities.

From an adult education perspective, professional development programs have to consider the characteristics of academics as adult learners and be aware of their problems, pressures and concerns (Lawler & King, 2001). In addition, in order to be effective, professional development requires time, dedication, perseverance and effort. If the teachers do not have the adequate time, the result can be counterproductive (just generating more stress). Sometimes, to avoid this problem, institutional initiatives look for stand-alone activities with a shorter format (courses with few hours, workshops, conferences, and so on). But, while these kinds of activities may provide necessary introductions to pedagogical approaches and to the uses of specific technological tools and some insight into their potential, we agree with (Glickman, Gordon, & Ross-Gordon, 2007), who say that the likelihood that the short stand-alone activities will effect lasting change in behavior (and practice) is minimal. In the perspective of this study, these kinds of initiatives are of little use, since it takes time to transform practice, after realizing what has been learned and reflecting on the process and the changes. Hence, the importance of providing a blended long-term program, which is more flexible regarding time aspects and at the same time, fosters the social side of learning, allowing teachers to discuss with colleagues, comparing and exchanging experiences, and sharing solutions and resources.

Most of the teachers participating in this study felt that their workload was so demanding that they could not do what they had to do

in the community within reasonable time. Despite the efforts to make the professional development program more manageable, the issues of time and workload remained a problem for many participants. The research literature (Lock, 2006) and the results of this study suggest that the establishment of extra time for continuous professional development in a community of practice approach is very difficult. Perhaps, due to the fact that time is a scarce resource and the institutional professional development activities are voluntary, there are few teachers at UNA who look for these kinds of activities.

The lack of access to the adequate technological resources is also another factor that affected the professional development. As it was showed in chapters six and seven, the access to technology and internet was fairly stable in some campuses, while in other campuses, the teachers experienced continuous problems with the access to the Internet and/or with the provision of a computer lab in which the students would be able to participate in the learning activities proposed in the pedagogical innovation.

Regarding access to Internet, this study supports the findings of (Schlager et al., 2002), who determine that the instability of the technological infrastructure can become an obstacle to the teachers' participation in online activities. They assert that network infrastructure ought to be in place to provide access to the technology and to suit the needs of the community.

In this study, even though 96% of the participating teachers had computers at home, only 65% of them had Internet access at home, so they depended on institutional facilities to participate in online activities. In addition, given the nature of the learning activities suggested by this study, it became evident that as the teachers put their learning into practice by designing and implementing an educational innovation, it was crucial that the technological infrastructure available in the regional campuses supported the innovation process, providing teachers and students with the resources required to experience the innovation as successful. Otherwise, the results can be counterproductive, causing frustration for both students and teachers, and as Lock (2006) states, reinforcing negative perceptions about using technology in teaching.

Lock (2006) states that the institutional culture in which the community is embedded can act as an obstacle to community development. In this study and in spite of the teachers' motivation, the insular way in which many teachers used to work affected the transition to a collaborative environment. It became evident that group work was difficult and, to some extent, it diminished rather than strengthened the community cohesion. This perspective adds complexity to designing

for a community, because in order to be alive, a community needs the development of relationships, active participation and productive interactions among members. In line with Preece *et al.* (2004), this study found that for teachers to work in a collaborative way, a redefinition of both the teachers and the institutional culture was needed. And, as Hunter (Hunter, 2002) argues, for this transition to occur, it is vital that the teachers receive support and incentives from the institution.

Another consequence of this trend towards individualism is that the teachers do not have references to compare their experiences. The university teachers rarely know what happens in the classrooms of other teachers. This study proposes that references are essential to convert abstract ideas about the quality of teaching in specific actions. To some extent, the community approach proposed by this study contributes to diminishing the problem of lack of references and examples of good practice.

Zabalza (2004) suggests that universities require systems combining mechanisms and conditions to enable, to attract and to put pressure on the gradual incorporation of teachers in professional development processes. The university has to remove obstacles (overloaded schedule, lack of time, lack of training offers), has to make training attractive (recognizing it as a merit, ensuring quality, adapting it to the needs and time available) and if necessary, employ mechanisms for direct or indirect pressure to help overcome the reluctance or disinterest (requiring certain levels of accreditation for teachers, linking professional development programs to teachers' assessment, making promotion conditional on participation in training programs).

Levels of engagement

Another factor that was identified by the study as an obstacle for the professional development process was the levels of engagement in the learning activities.

Wenger et al. (Lave & Wenger, 1991; Wenger, 1998; Wenger et al., 2002) indicate that there are typically three different types of participants in a community, ranging from the central participants, to active participants, to peripheral participants. This study also found differences in patterns of participation that reflects the division suggested by the authors. While these three types of participation are accepted as natural and legitimate in the context of communities of practice, high levels of peripheral participation is seen as problematic in a context of teacher professional development, as proposed in this study.

This study has found that the ways in which the teachers participate

and the level of sophistication of their contribution varied considerably from one teacher to another. The core members tended to be the teachers who were fully engaged in their professional development, despite other work activities. The other teachers showed difficulty maintaining a regular participation, so, in some cases they failed to become active members of the community. Teachers who felt less comfortable with technology also found that the time needed to resolve technical issues was disappointing, which contributed to their peripheral position in the process.

There were also differences in the responses of the teachers to the learning activities, especially in the discussion forums. The core and most active participants tended to write longer and more complex ideas, while less-active and peripheral members wrote shorter and simpler contributions, although there were exceptions. Although these differences are acceptable within the spirit of communities of practice, findings show that this can be problematic in the context of teacher professional development processes. The complex and extensive contributions of some teachers tended to create feelings of insecurity and inadequacy in some of the less active teachers. This contrast in the levels of participation must be handled sensitively in order to avoid serious damage to community cohesion. While it is necessary to continue encouraging the participation of quality, it is important that teachers, for whom this level of participation may be difficult, do not feel that their contributions are of little value.

Although passive participation is considered legitimate (Palloff & Pratt, 2005), and to some extent, it was agreed among UNA teachers that it was valid for them to interact at different levels, depending on particular circumstances (learning needs, interest, time, personal or professional reasons), in the dynamics of building a community, the lack of participation did have some effect. Just checking the community website on a regular basis and not contributing anything substantial to the discussion does little support to the development of the community (Preece et al., 2004).

In UNAgora, continuously passive participants were viewed as non-contributors and became a source of frustration for the visibly active participants. The community as a unit needed, as also identified by (Schlager et al., 2002), active participants to add value for all members in order to support learning, engagement, and the long term sustainability of the community. Increased active participation in online discussions may provide greater opportunity to explore how community members' create individual and collective meaning and develop individual and collective identity.

Another issue related with the levels of participation is the expected role of the facilitator in maintaining deadlines to the learning activities. Findings show that core and active participants wanted the facilitator to be tougher on maintaining deadlines, while peripheral participants valued more flexibility and tolerance. Another example of differences in patterns of participation in the professional development program was the development of nested sub-communities in three regional campuses. These sub-communities were not foreseen in the original study design, but findings showed they were a useful resource for supporting the teachers in the innovation process, in helping peripheral individuals to participate in dialogue, and in keeping some of them as participants in the UNAgora community.

With regard to passive participation, the main reasons why the teachers did not post in this study were mainly concerned with: no time to read the materials to make a sound contribution to the discussion, not being able to make the software work for their needs, and not feeling that their contribution was valued by other members of the community. Although most of the teachers confirm learning regardless of active or passive participation; in general, the satisfaction of the teachers that had a pattern of continuous passive participation throughout the study had a weaker experience of belonging to the community than those teachers who had a more active and vibrant participation (Havelock, 2004).

Teachers' readiness

The readiness is considered in two aspects: competences in technology and culture of online participation. Both of them were factors that also affected the professional development of the teachers.

The inclusion of mixed media elements is recognized in the research literature as a recommended feature of communities of practice (Wing Lai et al., 2006). Research has argued that the combination of co-located meetings and online activities is one factor that leads to transformative learning. In this study, face-to-face interactions to supplement online activity were included from the outset. One of the reasons that support this feature of the design was the premise that teachers can learn to teach with technology by first learning to learn with technology. Findings show that face-to-face sessions of any sort were found very valuable by the teachers in building relationships as well as in working through technical issues. However, given the geographical distribution of its members, UNAgora relies on online communication as its primary vehicle for connecting members.

Several authors (Eib, 2002; Killion, 2000; Lock, 2006; Salmon,

2004; Schlager et al., 2002), argue that in designing distributed communities of practice, it cannot be assumed that the teachers are familiar with online participation. Often, they are not ready to work collaboratively in online environments, nor do all of them want to participate in online discussions or activities. In this study, both of these aspects were present. As it was explained in previous chapters, many teachers in UNAgora were newcomers to the practice of online learning, so they did not bring with them a background of how to communicate online. Salmon (2004) argues that for teachers to contribute in the online discussions, they need to feel reasonably comfortable with technology. The study addressed the teachers' lack of confidence with technology through initial training and ongoing support from the facilitator. It was assumed that fostering confidence in using technology would positively influence their participation within the community.

However, for some teachers, the learning curve was so long or so frustrating that they gave up the community after two or three months of belonging to it. This fact entails that a longer and deeper training is needed for teachers whose technical competences are rather low. Despite training in the use of the technological platform and its facilities, a group of eight teachers (table 7.1, table 7.3) continued to demonstrate a limited online interaction. This fact is consistent with Wenger's assertion (1998) about communication in distributed communities of practice. He states that when the members need to make a special effort in order to connect to the community, the participation can be less frequent, increasing in this way the inertia in the community.

The behavior of the teachers in the online part of the professional development program was an indicator that additional conditions were necessary before the teachers were able to significantly interact online. From the quality dialogues that took place in the workshops it was evident that it was necessary to foster a culture of online communication and learning among teachers. Some of them did not feel fully comfortable with technology nor with online communication. These teachers expressed feelings of being alienated by technology, and they showed a clear preference for face-to-face communication.

It was learned from this study that it takes time to develop a culture of online learning and participation, and the ability to effectively apply technology for one's own professional development is something that is just beginning. This study supports the finding of Schlager et al. (2002), who asserts that in order to participate effectively in an online environment, the teachers need to be self-motivated, self-confident and to have the required technological skills. However, the study has also shown that, with an initial training phase, some teachers were able to overcome difficulties and became more active participants. But

for active participation, the easy access is a must and commitment is fundamental. In fact, in professional development processes supported by technology, commitment and self-motivation can be critical elements in participation regardless of a teacher's technical expertise.

Thus, the challenge for professional development processes oriented to community-building is to find the right combination of face-to-face and online activities, which can contribute to the development of quality discussion, social presence and the sense of community.

By using a community of practice framework to develop professional development programs, the academics were provided with opportunities for collaboration, co-construction of knowledge and professional inquiry. The community of practice perspective has the potential of bringing a learning environment where academics are invited to participate and reflect about the meanings of teaching and learning together with other academics who share the same interest in improving their practice. However, for the community to be a productive learning environment, it is necessary to consider and address the factors which may hinder the potential of the process.

9.4. How does technology contribute (or not) to the formation of the community, and to the professional development process?

In a study by the American Association of Higher Education, Rice and others (Rice, Sorcinelli, & Austin, 2000) suggest that university teachers want to pursue their work in communities where collaboration is respected and encouraged, where friendships develop between colleagues, and where there is time and opportunity for interaction about teachers and the institution. However, the major challenge of sustaining such communities seems to be time. Increased professional commitments (teaching, research, outreach and administrative tasks) leave academics with limited time for face-to-face professional development opportunities. Then, the natural question arises; can technology be used to create more flexible and accessible learning communities for university teachers?

Wenger (2001) stresses that in creating successful, distributed communities of practice, technology features are less important than social, cultural, and organizational issues. Nevertheless, the role of technology in distributed communities of practice needs to be considered as primordial. Technology supports communication and collaborative interactions. Communication and participation are central to the evolution of a distributed community of practice, and technology

is essential in supporting the creation of the relationships that help to build the trust and identity that define a community.

According to (Wenger et al., 2009), technology can help support a community's domain, community and practice by helping the community to:

> (1) express a common identity, project what a community stands for, and be a place for negotiating the domain, (2) sustain a mutual engagement around a practice, revealing the context for ongoing exchanges, accumulate knowledge over time, and provide access to the community's stories, tools, solutions and concepts (practice), and (3) support an experience of togetherness and connectedness, see connections between people, and help people to get to know each other in relevant ways (community).

In the following paragraphs, these three issues are analyzed under the lens of UNAgora.

Express a common identity, project what a community stands for, and be a place for negotiating the domain.

In this study, the ultimate goal is to foster a transformation in the teaching practice of UNA teachers. And this transformation was envisioned as an ongoing process of professional development taking place in the context of a community of practice which would foster the teachers' learning about student-centered pedagogical approaches and about technology-enhanced learning. As such, participation and interaction of teachers in the community of practice was considered an important condition for this transformation.

There is no negotiation without participation. Belonging to a community means participating in it, being part of their practice. It also means that the identity as a legitimate member of a community depends on the participation of the individual within the practice of the community, and in the end, it is this legitimate participation that defines what is learned and how (Wenger, 1998) As have been commented elsewhere in this study, for UNA teachers being a member of a distributed community, as UNAgora, implied facing challenges and being ready to accept changes. It also meant developing new skills and using existing skills in a different way.

Ollila & Simpson (2004) argue that learning is evidenced when there is increased participation in mutual and meaningful activities; negotiating and making meaning; and developing a sense of becoming

and belonging. The results of this study support this affirmation; we believe that members of a community can benefit from it when they are ready to participate, to negotiate meanings, to change and to innovate. And, from the results of this study, it can be concluded that usually, participation and negotiation are pre-conditions to change and innovation.

Therefore, encouraging participation should be one of the first goals of a community. But, in order to be prepared to participate and negotiate the domain in a distributed community of practice, it is clear that the members should, in the first instance, have a certain level of technical skills. In other words, teachers seeking to improve their practice through participation in a distributed community of practice, as UNAgora, should be familiar with online technology before they can participate productively in learning activities. It means that technology is a critical enabler of participation.

In answering the previous question about motivators and obstacles, the teachers' readiness in matters of technological competences and culture of online participation was identified as an obstacle for the professional development process. In addition, chapter six and seven illustrate how technology, in many ways, was a hindrance for the teachers' participation in the community. But, at the same time, it was also demonstrated that technology was the means that enables many of the benefits that teachers perceived from the community, such as connection with colleagues, experiments with new ways of communication and development of new knowledge and skills.

Furthermore, the online component of the UNAgora community created a unique opportunity to expand and sustain the dialogue and sense of community. The online discussion forums allowed the teachers to reflect individually on their teaching practice through the process of writing messages to their colleagues. Then, they were exposed to other perspectives different from their own, through reading the messages from other community members on discussion boards. It was, above all, through this sharing and exchange of thoughts that they were able to negotiate the domain of the community and its relevance to them. Hence the role of technology in the process of negotiation of meaning was essential

For some teachers, access to the community website was affected by a variety of factors as also identified by (Wenger et al., 2005) including: the learning curve to learn new software, the cost of buying the necessary equipment, the need for computers at home and at work, the internet access facilities, the institutional technological infrastructure, different needs and preferences, personal learning goals in the community context,

familiarity with the technology, as well as finding the time to explore these virtual environments in order to feel comfortable with them. These issues affected participation, and participation affected negotiation, and both of them affected the professional development process.

Technology also has a role on providing equity to all members of the community. On the one hand, online and distributed communities presuppose that all members have access to technology and to the Internet. And, this is critical in providing equity in the community. On the other hand, the ability to deal with technology may also be a matter of equity. Regardless the level of technological development of the platform and tools supporting the activities of the community, the members are generally expected to have digital skills involving the confident use of technology for work and communication. However, evidence suggests that this is not always the case. So, the community should support their members or take the risk that members with low technical skills could be excluded.

Peripheral participation offers fewer opportunities for professional development than full participation (Ollila & Simpson, 2004; Tu, 2000). For some teachers in this study, the learning curve of technology was longer than thought. This, together with issues of access, culture and time, made it difficult to achieve the multiple learning goals, build a distributed community and simultaneously provide content, training, and support through it.

In summary, in UNAgora, as well as in other studies (Hildreth et al., 2000; Schlager & Fusco, 2004; Wenger et al., 2002), technology was able to enhance and inhibit the teachers' interaction and learning. By overcoming limitations of time and space, technology opened the possibility of bringing a diversity of thoughts about teaching practice to a context in which the participating teachers could not only negotiate the domain and its relevance to their professional growth, but to advance the knowledge about it. However, as Havelock (2004) states, this potential was diminished by the initial cost in terms of technological comfort and ability, and I would add technological culture. Issues of access, culture and time, made it difficult to achieve the multiple learning goals, build a distributed community and simultaneously provide content, training, and support through it.

Sustain a mutual engagement around a practice, revealing the context for ongoing exchanges, accumulating knowledge over time, and providing access to the community's stories, tools, solutions and concepts.

In UNAgora, technology did mediate, support, and enhance interaction and learning activities. It helped in building a community, providing access to resources, providing flexibility, extending activities and saving time.

As members of a distributed community, the university teachers in UNAgora learned by creating and developing connections between ideas, experiences and information, and through interaction, sharing, understanding, discussing and defending their own opinions, their views, their current situation and their daily experiences. Often the learning took place through storytelling, reading, giving examples, by providing links and various resources, asking questions and giving answers. In the professional development process, transfer of codified knowledge was only a small proportion of the learning activities, while the main role was played by interaction among the teachers, leading to informal knowledge sharing based on their experiences and to the creation of knowledge based on a mixture of codified knowledge and new knowledge developed in collaboration. In this sense, the community provided the context, resources and opportunities to expand the horizons of the teachers and awareness of themselves and of other members. Professional development and personal growth was a parallel process between participation in conversations, negotiation of meanings, acquisition of skills and knowledge and, reification of the learning experience in a pedagogical innovation brought to the classroom.

Moreover, technology allowed the teachers to experience the technology before using it in courses. Those who had not had prior experience using Moodle and its tools before participating in community activities, talked about the technology and what they would like to do with it now that they had experienced working with it. More technologically skillful community members talked about the promise of other information technology (Hi5, YouTube, Flickart). The teachers' reflections on technology went beyond thinking about the technology. They considered specific forms of communications such as reflection, discussion and projects looking for ways to build more depth and meaningful learning for their students.

Technology contributed to building a shared repertoire among the teachers; they got a new language and new understandings about teaching, learning and their roles and responsibilities as university teachers facing new demands by their students, the institution and by the knowledge society. The teachers built a new identity as members of a community who were seeking to innovate their practice, and technology was both an object and a subject in this process. It was vital in two respects, in supporting the ongoing process of innovation and in being the main vehicle through which teachers, in this study, sought to

improve the students' learning. In this respect, technology contributed to both participation and reification. And, as Wenger and colleagues (Wenger et al., 2009) suggest, besides providing new ways of interaction and new ways of sharing artifacts, technology provides new ways to reify what matters about being together, thus it affords new ways to combine participation and reification.

Support an experience of togetherness and connectedness, see connections between people, and help people to get to know each other in relevant ways

The previous chapters addressed how technology (as infrastructure and as competence) may be an obstacle for participation in the community. But, technology was also the means by which the teachers had opportunities to connect with others and to experience and learn new ways of communication.

Technology provided a variety of ways in which the community members could be connected. It determined how UNAgora, as a distributed community, was organized. And, to some extent, it also determined the dynamics of participation and legitimacy in the community.

Through technology, the academics got to know each other, and established links difficult to achieve under other circumstances. Through technology, the teachers discovered each other and created an image of them as a community. In that sense, technology supported an experience of togetherness and connectedness. However, there were times that online communication (mainly asynchronous) was not sufficient for the teachers' feelings of isolation, and they asked for face-to-face communication. In these cases, this study agrees with DiPetta (1998), who argues that technology is a good support to communities as far as it coincides with the communication needs of the members of the community. In other words, there are some times that the technology may be sufficient to support connectivity, but not enough to support the sense of togetherness.

In this study, this seems to be associated with synchronous and asynchronous communication. Synchronous communication brings members together in time, thus it clearly contributes to both, togetherness and connectedness. Asynchronous communication lacks this feature, so some members may feel "connected" but not "together". In order for asynchronous communication to contribute to togetherness, it seems necessary to establish a rhythm of activity and presence in the online activities (postings in the discussion forums; providing new resources;

performing collaborative tasks; proposing collaborative projects and so on) which allow members to experience the sense of togetherness.

There is another issue related with this sense of togetherness or lack of it, namely *confusing the community with the technology* (Lave & Wenger, 1991). In UNAgora, despite of high levels of face-to-face participation, the non-participation in the online activities gave the feeling of not being full members of the community. Indeed, the distinction between the technology and the social conditions and processes that bring the UNAgora community together was not always clear for the participating teachers. According to Wenger (2009), communities are social entities and technology contributes to them by enabling social processes, but because technology - such as the community's website in Internet- is often more visible than the social conditions to which it aims to contribute, it is easy to confuse both of them.

In UNAgora, the connection between online participation and being a core member of the community was so strong that, to some extent, it put in the background the real commitment to embrace the new practice fostered by the community itself. For instance, those members who were very active in the online platform were seen by others as very knowledgeable members and gained the respect from the others. And, it happened regardless of their actual role as a practitioner in the new practice – one who was willing and able to transfer the learning acquired in the community to the classrooms. That is, between a teacher with a high level of participation in the online discussions but with a rather low engagement in designing and implementing the pedagogical innovation project - which really would make a change in teaching practice -, and another teacher with low presence in the online environment but with a high commitment[1] to transform practice, the first one was seen by the community and by the member herself/himself as a more engaged and core member than the second one, even though the second one was having a greater impact in changing teaching practice. Hence, the visibility that technology enabled was something that really matters in how a member saw herself/himself and was seen by others within the community. It was towards the end of the intervention, when teachers presented to others the results of their work in the classroom that some teachers re-positioned themselves as legitimate members of the community. Thus, it has been the pedagogical innovation that complemented and repaired the lack of online participation for some of the participating teachers.

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1 Those teachers explored a wide range of possibilities for integrating technology into teaching, including social networking tools, blogs and wikis, and then they proposed projects aimed at using technology and/or student-centered approaches to enhance student learning.

This indicates that there is an important but a subtle difference between participating in the *activities* of the community and participating in the *practice* of the community. The first one entails having a presence in the co-located meetings and participating with regularity in the online discussions, to form part of the group work and even to design the pedagogical innovation project. The second one means to be a practitioner of a new teaching practice (ICT+POPP) and it could be accomplished without necessarily having participated in all the proposed educational activities (and indeed this is the case for some teachers). Of course, it seems reasonable to expect that a greater level of participation in the learning activities is likely to produce a greater level of motivation and engagement towards the new practice. But, it has been showed by this study that there is no relation causing-effect between being an active participant on the learning activities and being an actual practitioner. The learning activity that had more impact on being a practitioner and acquiring an identity as such was the design of the pedagogical innovation project, as has been commented in other parts of this thesis.

In summary, the technology was a vehicle for building a community and supporting learning. It played a central role in UNAgora. It had the potential to increase the ability to work and learn from others who were geographically distant. It also provided new tools for learning and communication that enabled the university teachers to develop the interpersonal and intellectual competences necessary to construct shared understandings of their professional practice. Technology, together with the design and implementation of the pedagogical innovation, contributed to form the teachers' identities and defined who was a member of UNAgora.

9.5. What principles may be used to guide the design of a professional development model- based on communities of practice for fostering teachers' change of practice?

Thirteen conceptual design principles were developed in this study as results of reviewing relevant literature in Teacher Professional Development, Communities of Practice and Project-oriented Problem Pedagogy. These design principles were used to design an educational intervention aimed to produce a change in teaching practice of university teachers. Further, the conceptual design principles were elaborated in the form of guidelines, and these guidelines were classified within Wenger's learning architecture (1998). Chapter 8, deals with how these guidelines were modified through micro-cycles of refinement (Design-

Based Research Collective, 2003; Reeves, 2006), in order to adjust them to both the teachers' needs and expectations, and the professional development goals. In chapter 8, the modifications required to the design guidelines are explicated. In order to answer the last research question, "*What principles may be used to guide the design of a professional development model- based on communities of practice for fostering teachers' change of practice?*", this section takes a more overarching perspective, analyzing the conceptual design principles and what they mean for professional development experiences.

The set of thirteen conceptual design principles comprises the core principles of the three theoretical branches used in this study. The modifications resulting from the micro-cycles of refinement affected the operational design guidelines (see chapter 8), but not the conceptual design principles. This research found that the set of conceptual design principles that was developed for the community-oriented professional development program in this study can be used as overarching concepts to design appropriate learning environments for university teachers.

(1) Design for a learning environment that *enables the negotiation of meaning and the mutual construction of new understandings and solutions through an adequate balance between activities and resources for learning*

According to Wenger (1998), the negotiation of meaning is the central mechanism for driving changes in practice or learning, and it takes place in the inter-relationship of participation and reification. In the context of this study, this design principle aimed to provide situations in which the teachers participated actively in the generation of knowledge and were able to develop a sense of ownership in the production of that knowledge. The findings support that online discussions, readings, dialogues with experts, reflection processes, co-located meetings, group work, as well as projects provided an opportunity to explore, discuss, negotiate, evaluate and validate each other's understandings of core concepts. All of them were key resources for providing new ideas, concepts and perspectives on practice.

Reifications emerged from individual and social processes within the community, and provided a concrete representation of the teachers' learning processes. In this study, the pedagogical innovation projects may be seen as the leader in the reification of learning. They captured and embodied the teachers' learning experiences. The teachers engaged in their projects to construct an understanding of the community's domain and its implications for practice. It was this understanding, which arose from the participation and negotiation within the community, which was appropriated by the community and became part of teaching practice,

and not the intention of us as designers of learning activities.

Participation also requires reification in order to be meaningful (Brosnan & Burgess, 2003; Wenger, 1998). Findings of the study show that unless the teachers created some tangible evidence of their work within the community and some shared understanding about it, it was difficult to build only on interaction, and participation became less meaningful.

Thus, participation and reification were both resources to support competence. This design principle suggests that it is the interplay between participation and reification which creates new possibilities for the negotiation of meaning and new opportunities for communities to renegotiate their enterprise, to continue to develop their shared repertoire over time, and to improve their practice. It is also the negotiation of meaning which contributes to define the identity and membership of each member of the community.

(2) Design for a learning environment *that fosters building of social relationships and trust among academics*

The theory of communities of practice is at the core of the approach to teacher professional development used in this study. A strong commitment to the ideals of the community of practice was considered vital to achieve new values and beliefs about professional learning and new levels of knowledge, skills and practice.

This design principle entails a component of collegiality and collaboration (Gallant, 2000; King, 2003; Lloyd et al., 2005), where social interaction is a fundamental process of learning (Bransford et al., 1999; Brown & Campione, 1998; Lave & Wenger, 1991; Riel & Polin, 2004), and learning is seen as a process of participation and a function of being a member of a community of learners (Barab & Duffy, 2000). It means to create a safe place in which to make errors, experiment, complain, and think reflectively, and to encourage the sharing of stories, experiences, and collaboration with colleagues, expanding professional and personal networks (Wlodkowski, 2003) (Lock, 2006; Sorcinelli et al., 2006; Wlodkowski, 2003).

The community component of the approach aimed to reduce teacher isolation (Gray, 2004; Ramondt & Chapman, 2004), and to engage teachers with other colleagues in mutual, accountable and negotiable ways (Henderson, 2007). In this study, the teachers worked in a collegial way to learn more about key educational concepts and practices, and to share ideas and experiences in implementing them in classrooms. Trust was fundamental to allow university teachers to take risks, to expose themselves and to explore new approaches to teaching

practice.

The participating teachers came from a wider variety of areas of expertise and included beginners and experienced teachers. The findings showed that this diversity was highly valuable in building relationships, and it certainly created a varied set of ideas and experience. Throughout the study, there were good examples of novice teachers learning from experienced colleagues in the community, but equally some of the beginners introduced fresh and interesting ideas that widened the repertoire of older members too. This is consistent with the notion of multiple levels of participation in a community of practice from Lave and Wenger (1991).

Findings show that more than 80% of the teachers felt that the community offered them a safe and trusted space where they could express themselves freely. However, findings also suggest that, for some teachers, the level of trust and confidence needed to engage in a community of practice is something that had to be built gradually. Some teachers needed some time to feel accepted and become comfortable with the community approach and therefore, if they became fully involved it was only in the later phase of the program.

This design principle suggests that in order to promote trust and increase active participation and levels of interaction among teachers, it is important to foster the building of relationships from the beginning, and encourage the less confident members to participate and to stay in the community for long enough to allow them to feel more comfortable, to gain trust, and to begin getting a sense that they have a legitimate place in the community. All members, but mainly those who are less confident, need to be encouraged to see that they are able to become integrated into a community of practice, to learn its practice from and with others, and then to contribute with their ideas and thoughts to the development of the shared repertoire of the community.

(3) Design for a learning environment that *brings reflective and challenging learning experiences leading to a transformation of identity and practice*

Research has shown that prior knowledge, beliefs and experiences about teaching strongly influence the teachers' approaches to teaching and learning (Entwistle & Smith, 2002; Smyth, 2003; Trigwell et al., 1999). Therefore, effective professional development programs should bring opportunities for reflection upon the conceptions of teaching and learning (Gibbs & Coffey, 2004; Light & Calkins, 2008; Smyth, 2003).

This design principle entailed acknowledging the teachers' beliefs, assumptions and expectations; exploring the teachers' beliefs as part of

the professional development process; offering the teachers learning experiences capable of transforming their identities and their teaching practice.

Developing and nurturing reflection, in-depth dialogue and thinking was an important aspect of the approach of this study. Literature suggests that communities of practice can facilitate teacher reflection (Buysse et al., 2005; Riel & Polin, 2004), and by this process, they can help changing beliefs and attitudes towards teaching (Wing Lai et al., 2006), and instructional practice and strategies (Gallucci, 2003; Moore & Barab, 2002; Riel & Becker, 2000).

In this study, reflection was initiated by asking the teachers to express their thoughts and ideas about a topic, using both their understanding of the readings, and their own experience and knowledge. In this way, the community worked towards reifying its knowledge (Wenger, 1998), through developing a shared understanding about a particular aspect of teaching practice. The teachers were also asked to reflect, comment and discuss ideas with each other. This negotiation of meaning also contributed to the process of developing a shared understanding of practice. The findings show that a number of teachers were engaged as expected. Most reported that they enjoyed the process of sharing ideas and views, and receiving feedback on their thoughts. The quality of discussion generated by the more active and core members of the community was high, showing that the approach encouraged the teachers to think deeply. However, not all teachers achieved this level of reflection and thinking. Some of them did not find enough time to complete the reading neither to make thoughtful contributions to their online participation.

Effective professional development must increase personal skills, enhance their status within the learning community (Lloyd & Cochrane, 2006; Lloyd et al., 2005), and emphasize practical applications and connections to the academics' work (Lawler & King, 2001). In addition, in order to increase the opportunities for change, (Guskey, 1986, 2002) suggests that the teachers should have successful experiences of implementing change, because this positive experience would change their attitudes and beliefs.

In this study, the pedagogical innovation project designed, implemented, evaluated and communicated by teachers is considered as a challenging, meaningful and thoughtful learning experience. It required some degree of capacity, skills and knowledge from the teachers while engaged in a learning experience connected to their real-life needs. It also engendered competence (Wlodkowski, 2003), because it provided the teachers with evidence of the effectiveness of their new learning.

Through the pedagogical innovation project, the teachers realized not only how well they know and can apply what they have learned, but also how well the pedagogical experience worked for the students.

The pedagogical innovation project enabled participant reflection and self-assessment, and to some extent, it also reflected the range, depth, and development of the teachers' learning. The application of new learning in the classroom, deepens proficiency in using new knowledge and skills (Wlodkowski, 2003), and this has an important impact on the ability to effectively transfer and maintain the new learning.

Literature suggest that communities of practice are social groups that may facilitate identity building (Barab & Duffy, 2000; Gray, 2004; Guldberg & Pilkington, 2006; Henri & Pudelko, 2003; Hung et al., 2005; McLoughlin & Lee, 2008; Nett, 2008; Nichani & Hung, 2002; Preece, 2000; Riel & Polin, 2004; Wenger, 1998). This study argues that the community of practice approach together with the pedagogical innovation project focusing on practical problem-solving situations-, were the main contributors in building a new identity in the teachers as innovative teachers.

This design principle suggests that professional development programs should consider learning experiences which engender in-depth dialogue, thinking and reflection; and which deepen competence and transfer to real-world situations. These components may contribute to sustaining the new learning and the new teaching practice, and the community of practice becomes the social space that allows the teachers to realign their identities and practices (Henderson, 2007).

(4) Design for a learning environment that *provides academics with different ways of identifying themselves as members of the community*

According to Brosnan and Burgess (2003), designing for a community of practice should create a space for continued negotiability among all the members of the community. Following (Goodyear et al., 2001), this study put a conscious effort into the design of learning tasks, spaces and organization that would enable the university teachers to engage in dialogues, discussions, project work and negotiations, and in turn identify themselves as members of the community.

Findings show that the teachers participating in this study took part in the learning activities in different ways, assuming different levels of participation and roles. In spite of continuous motivation, there was no formal attempt to induce them in a specific role as normally outlined by the literature on communities of practice. However, some teachers assumed a central role when they helped facilitate the discussion or

contributed with additional resources to support learning. This was helpful for the whole community and empowering for those teachers.

Findings also show that there was considerable variation in the form of engagement and participation among the teachers. While some teachers engaged fully and promptly, others did not engage much in the community approach to learning. The wide differences in levels of participation among the teachers sometimes created discomfort and frustration in some members. It seems that the community members needed to deal with two different ways of regarding a community, or all teachers needed to understand and accept that they must participate fully, or they needed to agree that different levels of participation were acceptable in the context of a community-oriented professional development program.

The research literature on communities of practice emphasizes that communities need to have shape and structure, and pace and rhythm (Wenger et al., 2002). It also highlights the desirability of flexibility in time and structure to enable different members to approach the learning in a way that best suits them.

This study made use of planned schedules, directed readings and structured learning activities. While it allowed flexibility in time, and offered considerably longer time than the standard of professional development experiences, perhaps the intervention was more tightly planned and more top-down in management and structure than desirable in a community of practice approach. However, this structure was considered important to achieve a satisfactory result in the professional learning of teachers. The structure allowed the teachers to thoughtfully work through key educational aspects.

This design principle suggests that if a community of practice approach to professional development is to work for a wide range of teachers, they should accept different levels of participation, of engagement and of accountability, allowing all members to identify with the community in different ways. However, for the sake of harmony and professional development outcomes, it is suggested by this study that one of the first reflective activities in the community could be that the members discussed how they could envision the community and what kind of participation and accountability was expected from the participants.

(5) Design for a learning environment that *brings academics opportunities to negotiate, feel ownership, give meaning to and shape the practice of the community*

In order to be able to negotiate and shape the practice of the

community, the members need first to identify themselves with the community and feel empowered to shape its practice (Wenger, 1998). This empowerment, the ability to contribute to the community, creates the potential for learning (Wing Lai et al., 2006).

According to (Barab et al., 2001), one of the main features of a community of practice approach is that it enables members to articulate their understandings about different problems, and to examine them from multiple perspectives. However, having access to the community' resources is a pre-requisite for this negotiation to take place. Thus, the teachers' identification with the new teaching practices promoted by the community was considered fundamental in this study to create the potential for learning and to achieve the goals of professional development. Another important consideration was to ensure that the design of the learning environment was simple enough to allow all teachers to participate in the community life.

The outset source of the teachers' identification with the community was the domain of the community (ICT+POPP). The teachers envisioned the community as both an opportunity to create future personal trajectories within the university, and an opportunity to shape institutional teaching practices. Besides, the engagement by the domain itself, the design of the study promoted the identification with the community through diverse ways: scaffolding them in the use of the online website of the community; promoting a climate of trust; providing a safe place to experiment and to make errors; allowing different levels of participation in the activities and being flexible enough to provide the necessary time to reflect and to appropriate the new practices. However, although all teachers expressed feeling identified with the new practices fostered by the professional development program, not all of them felt the same towards the organization and the structure of the study, mainly referring to the communication and learning infrastructure proposed by the design, over which the teachers had limited opportunities for negotiation.

Findings show that the identification was easier for more technologically literate teachers, whereas teachers with limitations in using technology experienced diverse obstacles to fully identify themselves with the community. This fact is supported by the levels of participation and by the identities they constructed within the community.

According to Ollila and Simpson (2004), the connection between professional development, identification and negotiability is strong. Members identify better if they have opportunities to negotiate its practice. In this study, not all teachers had the same levels of

participation in the renegotiation process. Technical competences and lack of time were among the obstacles for participation. Low levels of online participation provoked a sense of inability to contribute to the community for some teachers, and this in turn weakened their feelings of ownership over the community's enterprise. In this respect, the findings also show that many teachers feel that some form of face-to-face activity is highly desirable to supplement the predominantly online mode of a distributed community of practice.

This design principle suggests that the design of the professional development model should offer teachers a scope for identification, negotiation and identity formation within the community. People should make sense of the domain through participating in the community, and in making sense of the community they may develop a sense of accountability and belonging to that community. For this, it is important to make values and practices of the community explicit, both in words and actions. The community of practice approach may provide a space for newcomers to learn elements of the practice and to enter its culture, and a space where all members may learn together and continue to shape not only their own identities as practitioners, but the identity of the practice itself. Furthermore, working and meeting in different modes (online and face-to-face), bring out different aspects of power relations and people's personality. Thus, the richness of using different modes for communicating is redistributing power relations, and re-shaping social relations, getting to know different ways of being and different entry points to people's knowledge.

(6) Design for a learning environment that *enables academics to envision possible futures and possible trajectories*

From the outset, the teachers in this study imagined themselves as a new kind of teachers, with a new set of competences and knowledge and with a new trajectory within the institutional context. This act of imagination (Wenger, 1998), was strongly linked with the teachers' disposition for learning and commitment to the professional development program.

The possibility for academics to envision possible future trajectories were accomplished by several and diverse ways in this study, among them, the pedagogical innovation project, readings, and contact with experts.

The design, implementation, evaluation and communication of a pedagogical innovation supported by ICT and oriented to problem-solving was a key component in fostering imagination, among others, it (1) offered an opportunity to explore and try new things; (2) provided

a problem in which resolution gave to teachers a feeling of competence in the educational setting; (3) gave the teachers an opportunity to be inventive; (4) motivated the teachers to create their own teaching strategies using their previous and new knowledge; and (5) favored that teachers saw themselves as leaders of the process of transforming teaching practices.

Learning and negotiation about other pedagogical approaches (POPP) and modalities of learning (online/blended learning) was a process of negotiation of meaning with readings and experts, and it offered the possibility to envision links between their classroom practices and broader worldwide educational practices. In addition, the meta-reflection forums, and co-located meetings provided teachers with opportunities for critical reflection.

Findings show that the teachers found the learning activities useful for creating images of what could be. They expressed having had opportunities to reflect, to explore different educational scenarios and new ways of teaching, all together aspects which enabled an adoption of other perspectives outside of their own teaching practice.

This design principle suggests that a professional development program should provide experiences that allow for construction of an image of themselves as a new type of teachers, and also push them to work to achieve that image. Developing an educational project oriented to solving practical problems in classrooms is suggested by this study as a learning experience with the potential to achieve this goal.

(7) Design for a learning environment that *brings possibilities of connecting local practices with the institutional and global practices*

This design principle entails providing teachers with experiences which enable them to contribute to a broader enterprise while they feel their new practice is valued –and rewarded - by the institution. It also means that professional development programs should orient their effort and energies towards achieving higher institutional goals.

According to Wenger (1998), a community of practice can relate with the rest of the world through the use of boundary objects, the use of multi-membership to make connections, and through boundary encounters. To some extent, this study made use of the three types of opportunities to establish links between local and institutional practices. It encouraged the exchange of knowledge and experiences among teachers from the same campus and among teachers across campuses. Findings show that this exchange was a fertile ground to critically explore beliefs and values about teaching and learning, and to promote individual and collective learning.

On the other hand, the pedagogical innovation projects were boundary objects that allowed the expansion of knowledge at the same time as they enforced UNA's new pedagogical model and new policies about the educational use of ICT. However, even though the pedagogical projects were aligned with institutional policies, it was considered important for the teachers to take a critical stand about those policies, and to critically reflect about the reasons underlying the institutional policies and their impact on their professional practice. It was not a matter of aligning themselves with the institutional practices without a thoughtful process of analysis and re-evaluation of their beliefs and values, making sense of the adoption of new ways of doing things. The data from this study shows that this learning experience was highly rewarding for the teachers, and was a key component in achieving the goal of transforming teaching practice.

This design principle suggests that professional development efforts should be oriented, on one hand, to enforce institutional vision and policies that enable the teachers to contribute to broader enterprises having an influence on curriculum organization and development of institutional processes; and on the other hand to promote the creation of institutional conditions that foster and reward teachers and a professional approach to teaching.

Furthermore, the teachers should have opportunities to do something in concert with other colleagues within and outside the community, and to be in touch with nationally and internationally broader contexts. The community of practice may be the context on which to build the expertise of the interdisciplinary teachers, allowing an understanding of perspectives beyond locally bounded practices, negotiating their contribution to the institutional educational practices, and facilitating the sharing of best practices.

(8) Design for a learning environment that *encourages active participation in which academics competently apply their learning in their own teaching environments*

This design principle follows the concept of action-oriented learning, which emphasizes providing opportunities to implement what is learned through practical applications and connections to teachers' work (Gallant, 2000; Lawler & King, 2000) (King, 2003). It also has to do with the fact that learning -in a community of practice context- is situated and authentic (Buysse et al., 2005; Davenport, 2001; Hildreth et al., 2000; Hung & Chen, 2001; Johnson, 2001; Lueg, 2000).

Research suggests (Cranton & King, 2003) that when teachers have the opportunity to link theory and practice, transformative learning can

occur. In addition, research also suggests that unless teachers promptly implement new ideas and practices gained in a professional development environment, there will be little change in their classroom practice (van Driel, Beijaard, & Verloop, 2001). In the model of professional development proposed by this study, the intention was that the teachers should implement new practices within the professional development experience. Thus experimenting with new ideas in the real world is not left to chance, but is built into the professional development process.

In this study, the teachers were asked to put in practice their new ideas and practices designing a pedagogical innovation in their classroom with an orientation to problem solving, evaluating this experience and then reporting back to the wider community to reflectively analyze the learning experience. The activity was highly situated and authentic. Findings show that despite of some problems related to time and perhaps energy constraints of busy teachers, this approach is highly successful in creating practical relevance for the teachers' learning.

Data presented in this study suggest that implementing new learning in practice is achievable and very important, but it may be difficult to clearly define the scope of the project. Some decisions need to be taken about how much the professional development program wants to push the teachers in one or another direction or to give the teachers the freedom to define what they want to transfer to the classrooms. The decisions taken can have an impact on achieve a higher professional development goal or not. For instance, although this study was pursuing a change of teaching practice through a mix of POPP and ICT, most teachers, as have been explained elsewhere, had a tendency to only work with ICT supported learning environments, and the study chose not to re-orient them. To some extent, this fact diminishes the outcome of the professional development program.

This design principle suggests that professional development programs should foster the acquisition of learning through engagement in practice and through experience (Wenger, 1998). Again, this study suggests the development of an educational project oriented at solving practical problems in classrooms and which embraces the main conceptual and practical components pursued by the professional development program as a learning experience with the potential to make learning meaningful, relevant and to have an impact on change in teaching practice.

(9) Design for a learning environment that *stimulates and motivates learning through the formulation, analysis and solutions of problems relevant to the academics' practice, profession, research, and passion*

This design principle has its roots in the theory of project-oriented problem pedagogy (POPP). In the context of teacher professional development, the principle supports the adult learning theories that highlight the need for situated and authentic learning experiences.

This study aimed to empower the teachers to change practice by a process of action, reflection and collegial support. The teachers defined a real problem, designed a plan for action identifying strategies to improve their practice (pedagogical innovation project), implemented the innovation, observed and evaluated the outcome (receiving feedback from students), and reflected on the action with new knowledge and with a new perspective on the problem. The fact that each teacher identified their own problem had the advantage of connecting the problem with the experiences of the participants, thus problems became a stimulus for learning (Dirckinck-Holmfeld et al., 2009; Kolmos et al., 2004). As there is ownership of the problem, motivation and participation in seeking and experimenting with new solutions increase.

At the end of the learning experience, the teachers reflected on the process and outcomes of their innovations. At this stage it was very important that the teachers clarified for themselves the importance and value of the action they had undertaken and considered the impact on their practice. The sharing of these critical reflections within the community allowed bringing implicit knowledge to the surface and gave opportunities to engage in constructive dialogue. The understanding of the knowledge gained by engaging in the innovation projects became part of the individual and community knowledge, which eventually led to the professional development of the university teachers.

Findings show that the pedagogical innovation project offered an opportunity to engage with authentic problems which required creativity and inventiveness. Using POPP as a pedagogical approach in the professional development model was an authentic and practical means of stimulating reflective and insightful professional growth. The learning experience was highly valued by the teachers and it was fundamental in the process of promoting changes in teaching practice. The community was a framework in which the teachers examined different perspectives of teaching. They got to see the teaching experience in a new light when others offered alternative views of the practice.

By participating in this learning activity, the teachers experimented by themselves with a POPP approach. To some extent, we assumed that they would implement the POPP approach in their own projects if they were actually directly exposed to the approach; however, as has been explicated before, this transfer was not so clear. It may be that the approach, as set up for this study, did not do enough to model

the POPP approach nor provide sufficient advice and support to the teachers to prepare them for the application of the approach in their own classrooms.

This principle suggests that the professional development model should offer opportunities to understand, discuss, solve and reflect on problems relevant to the teachers' practices. Participating in the formulation, analysis and solutions of authentic problems enabled the teachers to take active part in the generation of knowledge and develop a sense of ownership in the production of that knowledge.

(10) Design for a learning environment that *stimulates interaction and a sense of mutual responsibility for individual and group learning through group work and joint projects that create interdependencies among academics*.

One of the main features of POPP is that it is a vehicle for the development of inter-dependencies among participants (Fjuk & Dirckinck-Holmfeld, 1997). Interdependence refers to a state of mutual dependency that exists among the members of a group when individual success is influenced by the action of others (Johnson & Johnson, 1992). Thus, to some extent, individual success is dependent upon group success.

This study relies upon the teachers' interaction as a primary means of promoting learning. The teachers' interaction was planned at two levels: at the community level and at the group work level. The study aimed at making each group of teachers work closely together focusing on shared problems, activities, and tools as the central mediating principle of the learning process (Dirckinck-Holmfeld, 2002). It also means that the learning process is conceptualized as a process of mutual responsibility among all the teachers.

Within the groups, and in addition to the POPP approach (shared project work), the study used several strategies to promote interdependencies, i.e. common goals, division of roles and heterogeneous group composition (in terms of geographical location and technological competence level). The common goal was defining an educational problem to be worked out throughout the pedagogical innovation project. The roles in each group were assigned by the facilitator. Each role (coordinator, researcher, editor, reporter and facilitator) had specific tasks in order to both organize the work within the group, and to receive and give feedback from and to the whole community. The composition of the group was heterogeneous regarding geographical location, because the study aimed to foster relationship across campuses, and regarding technological competence because we envisioned that less competent

teachers would obtain support and help from the more experienced.

As explained in chapters 6 to 8, the working groups faced many difficulties and did not survive as they were originally conceived. In this sense, the study failed in creating positive interdependence around a shared research project and a shared problem formulation that could lead to productive learning. Then, the design of the study was re-oriented towards the development of sub-communities intra-campus rather than inter-campuses. Findings show that in some campuses, the development of interaction worked well, however each teacher was focused on his/her innovation project. Ties were created among teachers in the local groups, they supported each other through the process, but there were no high levels of interdependencies among them.

This design principle suggests that in a professional development model with a community approach, as proposed in this study, the teachers need opportunities to create positive interdependencies in terms of shared projects, the resources that needs to be shared, the task that needs to be divided, and the joint thinking that is required to solve the problem. In order for POPP to facilitate the establishing of interdependencies among teachers distributed cross-campus, it seems that other issues need to be solved, such as a culture of collaboration, time allotted for professional development activities, and competences to communicate and work online. These conditions seem necessary to enable productive group interaction and the achievement of group goals.

(11) Design for a learning environment in which *perspectives, experiences and context of the academics are acknowledged and mutually respected*

This principle came from the adult learning theories. It establishes that the individuality of each teacher - teaching and learning style, educational background, prior experiences, area of expertise, attitudes toward change and innovation adoption, work constraints and their professional development goals- need to be acknowledged and respected (Gallant, 2000; King, 2003; Lawler & King, 2000).

In the context of the study, we always understood that teachers bring with them a diversity of life experiences, education, learning styles and personalities. Their experiences influence their perspectives on learning (Daley, 2003), and their past training experiences may influence their motivation to engage in professional development activities. The study follows Lawler and King's (2000) principles of adult learning: creating a climate of respect, encouraging active participation, building

on experience, employing collaborative inquiry, learning for action, and empowering the participants. All of them form part of the underlying concepts that gave origin to the design principles. The community of practice approach, used in this study, also helped the teachers feel that all of them - regardless of their background or level of experience - could contribute highly to the community by sharing thoughts, ideas and experiences from their own professional and practical knowledge (Lave & Wenger, 1991; Wenger, 1998; Wenger et al., 2002).

We may suppose that the study was successful in making the teachers feel that they and their ideas were respected by all the others in the community. There was no indication of the contrary neither in face-to-face meetings nor in online discourses. Dialogue between the teachers and between them and the facilitator and researcher always maintained a friendly and respectful tone. All participants were respectful of the experiences and ideas shared by members of the community. Moreover, the professional and practical knowledge of the teachers was highly valued to the members of the community. It was regarded as an important source of ideas for the community. Sharing the diversity of the teachers' experiences and backgrounds allowed to take what is usually only part of an individual practice and reifying it in a way that became available for the whole community.

This design principle suggests that professional development models for teachers should always consider the fact that they are adult learners and as such have particular characteristics that need to be acknowledged. Moreover, these particular teachers' experiences, perspectives and context become rich resources for learning.

(12) Design for a learning environment in which *academics receive a sustained and ongoing support for learning*

Literature on professional development indicates that it needs to be prolonged, ongoing and sustained (Gallant, 2000; Lloyd et al., 2005). It has to provide adequate time for participation, reflection and implementation (Laurillard, 2002; Lawler & King, 2000), and there has to be time for a group to develop a shared repertoire (Cousin & Deepwell, 2005; Wenger, 1998).

The design of this study set out to provide teachers with sufficient time to develop in-depth knowledge, and to discuss and explore it in a distributed community of practice. Teachers participating in the study received ongoing, sustained professional development throughout a timeframe of thirty-two weeks.

The outcomes of the study suggest that this extended timeframe was key in promoting learning and changes in teaching practice.

The pedagogical innovation project in all its phases – designing, implementing, evaluating, reflecting and communicating – is a learning activity that requires time to be carried-out in an effective way. Furthermore, only by sustained engagement in practice, the teachers would have opportunities to contribute to the development of the shared repertoire of the community. To have time to develop this repertoire was considered an important aspect of this study because it comprises the aspects – both participative and reificative- that show the efforts of the community by improving their practice (Wenger, 1998).

The community approach of the study provides the framework for achieving this design principle. In their study, Lloyd et al (2005), made a comparison among eight models of professional development. They used a series of impact indicators to make the comparison, among them direct and sustained impact on teaching practice. The results show professional learning communities as the model with the greatest overall impact. The authors argue that the potential of learning communities to create supportive environments for teachers seeking to develop their professional practice and the ongoing nature of the community approach are among the reasons for the received high rating.

Teaching is a complex and challenging task, and teaching at the university level may be more challenging because usually university teachers do not receive any preparation to be teachers. This design principle suggests that in order to be effective, professional development should be designed to be an integral, ongoing part of the teachers' lives. The teachers need to see themselves as continuous learners who see their own learning as something that is sustained and intensive.

(13) Design for a learning environment in which *academics develop a positive attitude towards the learning experience through personal relevance and the connection to real and everyday needs*

A focus on relevance, and on the value of content and process learning gained through professional development experiences, is considered very important by the literature of teacher professional development (King, 2003; Lawler & King, 2000). This aspect of design is related with the concept of situated learning (Lave & Wenger, 1991). Teachers need to know what the purpose of any learning experience is and how it will relate, in a direct way, to their particular teaching work.

According to (Wlodkowski, 2003), relevance is a key element in developing a positive attitude at the outset of a professional development program. The participants should identify their perspectives, needs, and values in the content and activities of the program.

In this study, each learning activity had a focus on changes in

teaching practice through the introduction of ICT+POPP. Findings show that the teachers found the proposed activities very relevant for their daily work. Particularly the pedagogical innovation project was strongly classroom focused and as such responded to the teacher's expectations of transforming practice.

This design principle suggests that professional development programs should address the immediate and ongoing needs of the teachers. It should also be relevant, practical and meaningful. In order to achieve it, this study affirms what literature says about providing teachers with learning experiences connected to real-life needs of academics. POPP is suggested as an approach that facilitates relevant and meaningful learning.

Summary

The focus of this chapter has been on answering the five research sub-questions. From the first research sub-question it was concluded that the impact of membership on the teachers was complex, and it varied from teacher to teacher depending of their levels of participation, engagement, identification and empowerment to negotiate and shape the practice. It has been shown that the community approach contributed to increase their personal skills, to change their identities as innovative teachers, and to support reflection processes leading to a change in practices. The second research sub-question concluded that what is achieved by the teachers in this study is more than learning new facts, or transferring learned experience from one situation to another but a more general renewal of the teacher's beliefs. Their reflection on teaching and learning strategies and the positive experience gained after implementing the pedagogical innovation project in the classrooms were found to be the two most important elements in promoting changes in teaching practices.

The third research sub-question summarized the motivators and obstacles that the teachers faced in belonging to the community. Among the motivators identified were: establishment of new relations; a need for professional development; a desire of being part of something; and the teachers' personal engagement. Among the obstacles, the factors are summarized in three broad categories: institutional structures, levels of engagement, and teacher' readiness.

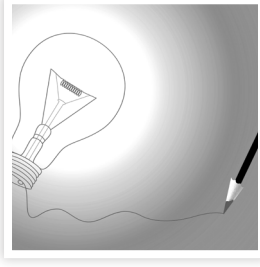
The role of technology in the formation of the community and in the professional development process was explicated in the fourth research sub-question. It was concluded that technology is a vehicle for building community and supporting learning. It played a central role in

this study, allowing the possibility to work and learn with teachers who were geographically distant, and also providing new tools for learning and communication. Following Wenger et al (2009), it was shown how technology supports the community by creating a place to negotiate the domain; sustaining a mutual engagement around a practice; and supporting an experience of togetherness and connectedness.

The last research sub-question dealt with the principles that may be used to guide the design of the kind of professional development model proposed in this study. In this answer, the effect of each one of the thirteen conceptual design principles in the educational intervention was explicated. It was suggested that the set of conceptual design principles developed by the study can be used as overarching concepts to design appropriate learning environments for university teachers.

In general, the chapter indicates that a community approach to professional development in higher education is viable; however it needs careful design if it is to work with a diverse range of teachers. Findings also show that while the approach was successful in many areas, there are aspects that require further work and research. The final chapter is dedicated to answering the main research question, to discuss the contributions that this study can make to the theory and to the methodology, as well as recommendations for further work.

Chapter 10



Conclusions and Reflections

Change is the law of life. And those who look only to the past or present are certain to miss the future.

John F. Kennedy

Conclusions and Reflections

This study aimed to develop an approach to teacher professional development with a focus on a distributed community of practice. It began investigating the research literature about teacher professional development, communities of practice and project-oriented problem pedagogy as outlined in chapter 2. The context in which this study was grounded is discussed in chapter 3. Literature on research methods was also reviewed, and a design-based research methodology was selected (chapter 4).

The study developed a community-oriented approach, as described in chapter 5, integrating the key principles identified by the main areas of literature involved. As the design was implemented, I observed, analyzed and reflected on the extent to which the approach meets its objectives. Using a design-based research process, the design was adjusted and modified throughout the study in an attempt to meet the needs and expectations of the teachers, as well as the professional development goals. Data obtained from the ten months during which the educational intervention took place were analyzed in detail and the results were reported in chapters 6 and 7. Then, in chapter 8, the design itself was discussed through a process of thoughtful and retrospective analysis.

In chapter 9, the key outcomes of the research were discussed and evaluated in terms of the five research sub-questions. In this final chapter, I reflect on the meaning and significance of the research while attempting to answer the overall research question. Reflections on the theory, the methodology and the sustainability of the intervention are also provided. The final section provides suggestions for future research.

10.1 A Community-Oriented Professional Development Framework

The main research question of this study was set out as "To what extent can a professional development framework based on the principles of communities of practice support a transformation of teaching practices in higher education, specifically regarding the introduction of ICT and POPP?"

The answer to this question has indeed been explicated throughout this entire thesis, and particularly in responding to the five research sub-questions. Many element, activities and attitudes have been mentioned

as contributors to answer this question. However, three professional activities have emerged as the most influential in the process of achieving a transformation of teaching practice, which is the ultimate goal of this study. In fact, it is the interweaving of these three components which appear to have the greatest potential.

- Reflection
- Project-oriented problems approached through the lens of a scholarship of teaching; and
- Participation in a community of teachers

The three components have been identified as key principles by the literature of professional development (chapter 2). However, this study contributes to this body of knowledge in two ways. First, the study suggests that in order to increase the potential of projects (as a way the teachers to implement what they have learned) and critical reflection, a scholarship of teaching approach should be used as an overarching perspective to guide the teachers in the process of transforming teaching practices. This would entail a reflective stance to teaching; approaching the problems that emerge in teaching practice as matters of ongoing investigation; and to make educational processes visible and public, opening in this way opportunities for colleagues to analyze and discuss those processes and as a result learn from each other about practices that are effective in improving learning. Second, this research suggests that the highest potential to promote and sustain a transformation in teaching practices relies on the interweaving of the three components.

The first component, reflection, has been identified as a basic framework for improving teaching and learning in higher education. It is a valuable resource for teachers engage with new ideas. The study states, in tune with the literature, that a critical reflective practice where teachers have opportunities to question their values and beliefs about teaching; to question themselves about their identity and role as teachers; and to imagine themselves as a new kind of teachers, holds the potential to shape their identity and to make a thoughtful and sustained change in their practice. Without reflection, the teachers may be not able to create and pursue new challenging trajectories. In this study, reflection provided the teachers the space to critically think and assess new ideas and what was happening in their teaching practice while they were implementing the pedagogical innovation project. In this sense, both activities are close linked.

The second component is allowing teachers to reify their new knowledge. It follows the concept of action-oriented learning, which

emphasizes providing opportunities to implement what is learned through practical applications and connections to teachers' work. In this study, this connection between theory and practice was reified through a project-oriented problem intended to make a pedagogical innovation in teaching practice. Each teacher identified a relevant project and then they designed their own solution to it. The pedagogical innovation allowed them to explore the relationships between technology, POPP pedagogy and content. It was a central facility for supporting engagement, imagination and alignment, allowing the teachers the creation of alternative learning scenarios, envision new trajectories and, in many cases, pushing their own boundaries. Through the pedagogical innovation project, they had the opportunity to contribute beyond their engagement, having an effect in the teaching practices at their local campus and in the institutional teaching practices.

The scholarship of teaching approach towards the professional activity of formulate a problem, design a solution, implement and evaluate it, enabled teachers to discuss change, to gather evidence of the effectiveness of changes and to receive feedback that would make the process of change easier. This approach enable teachers to think about teaching practice and student learning as problems to be investigated, analyzed, and discussed.

The community component creates the social context for collegial learning and dialogue in which teachers can construct an identity in relation to the new practice. It contributes to expanding professional and personal networks, fostering a culture of sharing among teachers and reducing teacher isolation. It may also provide teachers with a safe place to make errors, to experiment, and to explore, discuss, reflect and re-conceptualize their conceptions and values about teaching practice. A productive community of practice, in a context of professional development, offers teachers learning opportunities of doing, belonging and becoming, transforming the process of learning in a process of identity formation and not just an accumulation of skills and information. In summary, the social nature of learning in the community creates the context and the productive conditions for teachers to transform their identities through transforming their knowledge and actions.

In concluding, I suggest that professional development has greater transformative potential if it enables the teachers to apply what is learned in practice and to use a scholarship of teaching approach to guide, share and assess the change process. Reflection emerges as a resource to the teachers' examination of their pedagogical beliefs and practices, and engagement with new ideas produced during learning and during the process of investigating and changing their practices. The community context supports the need for teachers to engage in reflective dialogue

and action-oriented activities that challenge and shape their identities, beliefs and practices. It acknowledges the importance of the teachers' dialogue within a supportive environment.

The dynamic interplay between these three concepts seems to be the leading force for a transformation in teaching practices. They provide teachers with the ability to move from their existing pedagogical beliefs and practices to a state where these beliefs and practices are evolving. Transformation of practices occurs when reflection is combined with research on changes in practice, and when both of them are embedded within a set of relationships formed in a community context.

However, from this study is also possible to suggest that some conditions need to be considered in order that the desired transformation of practice can occur within the context of a distributed community of practice as the one analyzed here. The teachers should be familiar with online technology otherwise they should receive training adequate enough to enable them to be a productive member of the distributed community. Different levels and styles of participation should be legitimized, allowing that all teachers, even those less confident and less active, feel comfortable with their respective levels of participation and contributions within the community. Complex power relationships among teachers and authority issues also need to be handled sensitively, regulated and balanced in order to avoid serious damage to the community cohesion. Institutional infrastructure and support are also key factors. The teachers should have allotted time for professional development within their workload; they should have access to adequate and stable technological infrastructure: and they should receive incentives from the institution.

10.2 Reflections on the Theory

The central postulate of this study is that a community approach to teacher professional development is viable and offers potential as an option for effective professional development of university teachers. The study has been an exploration of how theory plays out in practice. As a result, there are some reflections that I can make in relation to theory.

Overall, the theory of communities of practice has been very useful to this study because it provides an understandable way to conceptualize and apply the theories of social and situated learning in a specific context. It is a valid resource to understand learning as situated, and how the learning process is connected to negotiations of meaning and the two joint processes of reification and participation. In addition, the theory describes a natural mode of adult learning, which is relevant

to this research.

The study suggests that conceptualizing teacher learning within the context of a community of practice is a powerful means of achieving effective professional development. The theoretical tenets of communities of practice support learning as a social phenomenon, and knowledge as inseparable from practice. This is highly consistent with the goals of the study, when it is envisioned that teachers draw on new knowledge, attribute meaning to it through individual and collective reflection, contextualize it locally and translate it into practice through everyday interaction.

On the other hand, issues of hegemony, power and conflict within communities of practice were present in the study, and were difficult to manage within the context of an educational intervention aimed at teachers' professional development. The UNAgora community was, to some extent, vulnerable to domination, and power relationships that could affect the learning processes. As it has been described in the previous chapters, the high powered contributions and strong social presence of some members in the community, was not always positive for global levels of participation and engagement. Some less confident and less active teachers expressed feelings of insecurity, inadequacy and self-doubt. This also provoked that those members remained in the periphery, and to some extent, felt excluded from the community. So the question here, following Huzzard (2004), is whether these unequal relationships of power are a hindrance for learning. Should the professional development model make efforts to break down these inequalities in order to enhance learning or should these be accepted as part of the dynamics of a community of practice? Do core members have greater authority to set the tone and the rhythm of the community? Can learning, collaborative work and change keep taking place, without leadership? According to the results of the group work, and even though more equal relations are desired, it seems that a certain level of domination is required (for instance from the group coordinator) in order to direct the learning and organizational processes needed to accomplish the group work and the productive realization of learning projects.

Another issue is related with the self-directed, self-organized nature of communities of practice (Lave & Wenger, 1991; Wenger, 1998) versus a re-conceptualization as a more formalized concept purposefully designed as a resource for enhancing teaching practices. As an instance of this apparent contradiction that needs to be reconciled, we can use the participation in asynchronous discussion. Some design strategies to "push" dialogue seemed necessary for promoting learning, but I was committed to the idea that there must be some commitment on the part

of the teachers to want to engage in an academic and collegial discussion. It also has to do with the design - how could we balance the design to achieve the professional development goals while it is embedded in the informal and voluntary nature of participation in a community? Should a professional development model let members define the power and direction of the community, or should we design more structured ways of organization and learning for the sake of the professional development goals?.

Although this study was not designed to address these questions, we can say on the basis of the experience of UNAgora that a balance between the formal nature of professional development and the informal nature of communities is needed, at least while teachers do not change their perception about professional development. For many years, the teachers at UNA have been exposed to highly structured transmission models of professional development. To shift from this model to a community model requires that they understand their learning process in a different way. It also entails a cultural change from a highly individualist conception to a culture of collaborative learning and sharing. As Wenger (1998) says, a shift in emphasis from formal training to learning in practice is needed. These issues of power and self-regulation offer ample opportunities for further discussion and research. We can improve our understanding of the theory by researching communities of practice as they exist or are fostered among a diversity of settings.

10.3 Reflections on the Methodology

This study is embedded in the design-based research literature regarding the structure of the research and the reporting of findings. Design-based research is a research methodology that has in its core the concept of "theory informing practice", and the creation of design principles that can transform educational practice. Its nature allows us to view research participants as partners with valuable knowledge for co-design rather than experimental subjects to manipulate. The approach suggests that the researchers must respect their viewpoints on the objectives, process, and outcomes; even if this diverts their attention from the theory and the changes they want to promote.

In this regard, the methodology is a useful resource for this study because, as it has been identified by Dede (2004), it defines a middle ground that starts with the practitioners' issues, but then helps them evolve their thinking towards the transformative approaches in which the researcher is interested. Further, the iterative nature of the methodology is very helpful in proposing changes to the design guidelines and then to the learning environment. It enables conceptual

design guidelines to be developed and then modified as results of the learners' activity or as results of the evolution of the context in which the learners are active. This ability to transfer characteristics of the research process to the design process is another positive aspect of the approach. This mechanism could be seen as the ability of a design-based research process to help align theory and empirical outcomes. This alignment is, according to Hoadley (2004) a strong basis for systemic validity. However, it is also found that this iterative nature of the approach was difficult to follow in a long intervention - framed in a relatively short PhD process-, where the research cycle produced some changes that could not be tested in a following cycle.

This latter issue has been discussed by some researchers (Herrington, McKenny, Reeves, & Oliver, 2007; Reeves, 2000), who argue that is not feasible for PhD-students to engage in this type of projects within a normal frame of 4-5 years. Design-based research requires prolonged periods of fieldwork, followed by periods of review, reflection, redesign, and fieldwork again. The structure of the PhD studies in a period of three years did not make viable, in this study, the implementation of more than one macro-cycle of research.

According to the literature (Bannan-Ritland, 2003; Design-Based Research Collective, 2003; van den Akker et al., 2006; Wang & Hannafin, 2005), the methodology is very promissory as an alternative model for research in the educational field. However, the same literature claims by a lack of methodological standards and processes to guide the researchers in how to conduct design-based research. In this study in particular, I felt a void about which tools may be used to facilitate the interaction and dialogue among researchers and practitioners. Throughout the study, I have used all the resources that were within my reach, such as online discussion boards, email, and chat. Further, a set of four workshops were developed using diverse materials and techniques (Lego bricks, storytelling, drawings), with the goal to establish a meaningful dialogue among the participating teachers and the researcher.

The techniques applied in the workshops and the long term engagement of the participants in the learning environment of UNAgora supported a broad negotiation of meanings and contributed to an understanding of the strengths and weaknesses of the design of UNAgora. Moreover, the workshops contributed to visualizing a strategy for the sustainability of the community, and the feedback received from the teachers who participated in the workshops was very positive. However, this study suggests that this lack of tools, and knowledge about how the different tools support the dialogue process may increase the complexity that have to face design-based researchers while they develop innovative learning environments, implement them in a real context, and iteratively

evaluate their outcome.

10.4 Reflections on the Sustainability of the Innovation

The design-based research process guiding this study follows the model of Reeves (2006) but expands the model with a fifth phase "Dissemination and adoption in broader contexts" (see Figure 4.3) that explicitly deals with the dissemination, adoption and sustainability of the educational intervention. The dissemination process includes both the practitioners and the scientific community; and the adoption and sustainability address the question whether participants are able to make the innovation sustainable after the researchers have left the context as also suggested by (Fishman et al., 2004).

This fifth phase was added to the process because the communication of the findings should be considered central parts of the intervention in order to sustain the intervention; and as Fishman et al. (2004) state, design-based researchers need to consider external factors if they hope for their innovations to have a broader use beyond the original research context. In this study, the sustainability of the educational intervention was a goal from the outset. Even when it is beyond the scope of the researcher to guarantee the sustainability, usability and scalability of the study discussed here, a considerable amount of time was taken throughout the intervention period to discuss with the participating teachers the future of the community and a strategy for its sustainability (this work was addressed through a discussion forum, a workshop and face-to-face group work). In all three activities, the teachers took charge of self-designing the future of UNAgora. The teachers negotiated important issues such as the integration of newcomers (How do we become a "place" to receive new members?; Who should be the new members?; What is our role as members with experience? and, Who will assume the leadership of the community?), and the future learning agenda (Which kinds of activities do we need?; What kind of knowledge do we require? and, How do we make our learning agenda "compatible" with the interests and needs of the new members?).

Appendix K, shows a conceptualization of how the teachers visualized the community after their experience of belonging to it during ten months. In this reflective activity the teachers used their learning experience to imagine a potential future.

In summary, the strategy followed by this study to foster the sustainability of the intervention (reified in the UNAgora community) is supported by one of the main characteristics of design-based research,

the fact that design researchers need to work closely with practitioners, and that they are the ones who need to be receptive to innovation and willing to experiment with new methods, and approaches. It is clear, that, in this situation, some practitioners may be able to contribute significantly to sustained innovation. In the case of UNAgora, a core group of teachers was formed after the intervention period and jointly with the research team (facilitator, observer, coordinator of UNA-Virtual and researcher), this group developed a sustainable strategy that was presented to, and indeed accepted by, the institutional authorities.

To some extent, the study illustrates that the process of institutional change begin with the individual. Teachers became innovators and the starting point of the process. UNAgora is a model that gives structure to these teachers to meet, discuss, learn and develop in a supportive environment. The satisfaction that the teachers obtain derives not only from their personal achievements, but also from the satisfaction they feel when they see changes in colleagues, and expectations in their surrounding environment. This serves as motivation to take the experience further and diffuse their new ideas to a larger audience.

To move to the next stage of the process, a supported structure must be in place which is both available and appropriate for inviting newcomers into the community. A suggestion that I would make on the basis of this research is that the institution should provide a range of strategies to create the conditions and make the space for this type of innovation. Thus, it could create ways of allowing the innovation to remain by making changes to institutional processes and procedures that will support the participating teachers. This is another issue that deserves further research.

10.5 Reflection on Issues of Scalability and Generalizability

There is a number of limitations in this study regarding scalability and generalizability that needs to be acknowledged. This study is a relatively small and highly specific one. The research literature suggests that often small scale studies cannot be applied widely in education unless they are both scalable and sustainable. Whereas some issues of sustainability have been considered as part of the study, the scalability understood as the ability to adapt the innovation to effective usage in a wide variety of contexts, including settings where major conditions for success are absent (Clarke, Dede, Ketelhut, & Nelson, 2006), could be more challenging.

According to Dede (2005), in fostering scalability it is necessary to differentiate the design of the intervention from its conditions for success. This study has identified some of those conditions for success, such as the teachers' readiness in competences in technology and culture of online participation; and some institutional infrastructure which also needs to be in place, such as issues of access, time and workload. But because the intervention runs through only one macro-cycle, it was difficult to assert whether the outcomes were results of the design or resulted from other factors in the learning environment. This fact and the potential high diversity in other contexts, in needs and conditions, may prove difficult to pursue terms of scalability and at the same time maintain a certain level of effectiveness and affordability.

The issue of generalization of findings is something widely discussed among design-based researchers (see chapter 4). This study is bounded and situated in a specific and particular context. The intention of the study is to illustrate a particular phenomenon rather than to generalize the results. The particular dynamics of the context in which this study is embedded, the design decisions and the research outcome have been illustrated, throughout the thesis, by rich descriptions. It is hoped that this way of presenting the findings allows the readers to grasp the meaning of the research and to make inferences to other situations by an analysis of similarities and differences between the contexts or situations.

10.6 Further Work

On the basis of this study, there are a couple of issues which I may suggest, requires further work.

One possible avenue for further work resulting from evidence in this study is the potential that appears in the locally-nested sub-communities which emerged in three regional campuses within the study. It seems that a community framework that combines a distributed global institutional community with campus-based co-located communities is a productive approach to promote collaborative work and collegial support. The approach could have some advantages as is more likely that the authorities of the regional campuses be aware of and support the community by providing the teachers with time within their workload to engage in community activities. This would resolve some of the problems faced by some teachers in this study. Further work needs to be done to explore this possibility and to define issues, such as the kind of learning activities that should take place in the sub-communities and in the whole community in order to make professional development more effective. Also this approach may assist with scalability and sustainability issues.

Another issue that may require further work is related with the different levels of engagement that the teachers presented in this study. To what extent can a community oriented professional development allow individuals to engage in the learning activities in very different levels without diminishing the learning outcomes for the whole community? Or, should it be possible to offer different learning pathways within the community without diminishing the sense of shared community? Could the different learning pathways be alternatives to offer experiences of professional development to a greater number and diversity of teachers? The answers to these questions could be explored in further research.

Issues of power and self-regulation, and issues of institutional infrastructures to effectively support the teachers' participation in communities of practice oriented to their professional development, as were discussed in sections 10.2 and 10.4, also offer ample opportunities for further discussion and research.

10.7 Final Thoughts

Like many teachers in higher education, teachers at the Universidad Nacional are faced with the challenge of re-inventing their teaching practice, mainly referring to the use and application of information technology in their courses, and moving towards an approach more centered on students than teachers.

The current knowledge base about adult learning and professional development suggests that professional development should include voluntary participation, mutual respect, collaborative effort, collegial dialogue and critical reflection. Given these principles and the learning needs of the UNA regional campus teachers, a distributed community of practice approach to professional development was explored in this study. A community of practice is defined as "a group of people who share a concern or a passion for something they do and who interacts regularly to learn how to do it better" (Wenger, 2004) . Further, Wenger states that a community of practice is a form of organization that encourages knowledge sharing, learning and change. In this study, the community of practice theory is blended into the fundamental principles of professional development to provide university teachers with new learning opportunities leading to support change of practice.

The desired transformation of teaching practice was addressed through fostering the integration of POPP and ICT in classrooms. POPP was chosen because it is known as a pedagogical approach that facilitates moving from a model based on the delivery of information to a model that promotes learning as knowledge construction (Dirckinck-

Holmfeld, 2002; Kolmos et al., 2004), and ICT is currently ubiquitous in higher education and is seen as an opportunity to add new dimensions to the teaching-learning process and as an opportunity for more radical transformation of teaching and learning (Dirckinck-Holmfeld & Lorentsen, 2003). Moreover, UNA has a new pedagogical model that is consistent with both components – student-centered approaches and introducing ICT in the learning process, and this model also encourages an educational practice aimed at reflection, participation, collaborative work and innovation (see chapter 3).

The concept of community was introduced in this study as a highly collegial and not threatening learning experience, where every university teacher was accepted and obtained support, help and encouragement. To this extent, the community approach provided an environment for learning and dialogues that enriched and deepened the teachers' knowledge, understanding of important educational issues and change of practices. The online discussion environment provided a structured forum for teachers to discuss readings with experts, with colleagues, and to relate them to their own experience. As the approach developed, learning structured experiences resulted in teachers designing, implementing, observing, evaluating, reflecting on and discussing their own classroom experimentation with new ideas.

The community approach used in this study was tailored to a professional development environment. Rather than being evolutionary, as most of the literature suggests, the community was structured and managed, and the scope of action inside the community was strongly scaffolded. The UNAgora teachers went through a process of change, first developing a personal awareness of their beliefs and attitudes about teaching and learning; then learning about new pedagogical approaches and the potential of technology to enhance learning; then articulating the process of innovation, expanding the scope of innovation and change to classrooms, and finally evaluating and communicating the outcomes to broader audience. After a life-cycle of ten months, it was possible for this study to establish that, under certain conditions, an approach of this kind is capable of supporting a transformation of teaching practices in higher education involving the introduction of ICT and POPP.

In closing, the interweaving of three key elements – reflection, projects (under a scholarship approach), and community- were found primordial to promote and sustain change in teacher approaches. Issues of access, competence, culture, workload, power and time sometimes made it difficult for this study to achieve its multiple learning goals - build a distributed community, foster collaborative learning, and promote changes based on the integration of content, pedagogy and ICT-. However learning and change did take place and the teachers

became more knowledgeable of their practice, gained an impact on the institutional practice, and many of them reconstructed their identity as innovative teachers. To this extent, this study contributes to show the potential of the proposed approach as a productive method for teacher professional development.

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Appendices

Appendix A

Focus Group Discussion Framework

Objetivo: Analizar las experiencias y expectativas que poseen los Académicos de la Universidad Nacional, que ya han participado en el curso Innovación Docente impartido por UNA-Virtual, con respecto a la incorporación de las Tecnologías para la Información y la Comunicación (TIC) e innovación docente.

Agenda

Bienvenida

- Agradecer por la participación
- Explicación del objetivo de la investigación
- Explicación del objetivo del grupo focal

Preguntas guía

1. Aspectos positivos y negativos de la experiencia de aprendizaje vivida.

2. Relevancia del curso para su práctica docente/ desempeño profesional. Experiencias vividas cuando realizaron la implementación del curso en su práctica docente, reacciones de los estudiantes, de otros colegas, etc

3. Actividades propuestas en el curso: promueven el trabajo colaborativo?, que tipo de actividades les resulta más significativa?, experiencias vividas con las actividades (sincrónicas/asincrónicas), wikis, chat, foros, cual actividad es más valiosa, cual menos, porque?, sugerencias

4. Relación con los otros participantes del curso. Se desarrolló en el curso algún tipo de pertenencia, de sentimiento de grupo? Se mantiene algún tipo de relación/ comunicación con los otros participantes del curso? Por qué si?, qué tipo de comunicación? Por qué no?

5. Interés en participar en una comunidad de docentes interesados en innovar su práctica docente mediante la incorporación de las TICs, y mediante el intercambio de experiencias.

6. Sugerencias para mejorar el diseño del curso y su impacto en la práctica docente

Cierre

- Hacer una breve recapitulación de la información obtenida
- Agradecer la participación
- Realizar una invitación abierta a participar en la comunidad de práctica.

Appendix B

Questionnaire No.1: Teachers' profile

Estimado(a) académico (a):

Le damos una cordial bienvenida al proyecto de investigación "Creación de una Comunidad de Práctica en línea para la Innovación Académica en las Sedes Regionales de la Universidad Nacional", cuyo principal objetivo es el de promover procesos de innovación en la práctica docente de los académicos de las Sedes Regionales de la Universidad Nacional, mediante el desarrollo y aplicación de estrategias pedagógicas innovadoras y tecnologías para la información y la comunicación, facilitando a su vez las condiciones sociales y tecnológicas para la creación de una comunidad de práctica[1]. Este proyecto nace dentro del marco de colaboración entre la Universidad Nacional y la Universidad de Aalborg, Dinamarca, específicamente como parte del proyecto de doctorado de la MSc. Mayela Coto.

El proyecto busca un cambio en el enfoque de desarrollo profesional, de una formación tradicional a un aprendizaje en la práctica, fomentando una comunidad donde los docentes reflexionan, comparten experiencias, experimentan con nuevos contenidos, aprenden colaborativamente y se proporcionan apoyo mutuo en aspectos pedagógicos, técnicos y sociales.

Un elemento fundamental para el proyecto es la identificación de las expectativas y necesidades tanto pedagógicas como tecnológicas de los académicos participantes, así como el conocimiento de las experiencias previas que posean. Es por tal motivo que les invitamos cordialmente a que contesten este cuestionario y lo retornen a la dirección uvirtual@una.ac.cr antes del día 14 de diciembre, ya que es de vital importancia para el equipo investigador contar con esta información antes del receso institucional. La información solicitada es insumo valioso para el proyecto de investigación doctoral y será considerada en el diseño del entorno pedagógico y tecnológico que soporta al curso como elemento generador de la comunidad de práctica.

Agradeciendo de antemano su atención y deseándoles una feliz navidad,

MSc. Willy Castro Guzmán
Coordinador UNA-Virtual
UNA

Msc. Mayela Coto
Investigadora, Universidad de Aalborg
Docente, Escuela de Informática, UNA

1 Una comunidad de práctica es un grupo de personas constituido con el fin de desarrollar un conocimiento especializado, compartiendo aprendizajes basados en la reflexión compartida sobre experiencias prácticas.

1. Información personal		
N°	**Aspectos por considerar**	
1.1.	Nombre	
1.2.	Edad	
1.3.	Área profesional	
1.4.	Grado profesional	
1.5.	Años de docencia universitaria	
1.6.	Tipo de nombramiento	Propiedad

2. Soporte tecnológico disponible			
N°	**Aspectos por considerar**		
2.1	Posee computadora	SI ☐	NO ☐
2.2	Tiene acceso a Internet?	SI ☐	NO ☐
2.3	Adonde?	Universidad Casa Oficina Café Internet Otro	
2.4	Qué tipo de conexión?	Red local MODEM residencial RDSI ADSL (Avanzada) Cable modem Otro	
2.5	Desde que lugar tendrá usted acceso al curso?	Universidad Casa Oficina Café Internet Otro	
2.6	Esta usted familiarizado con el uso de herramientas ofimáticas (Word, Excel,…)	SI ☐	NO ☐
2.7	Esta usted familiarizado con el uso de buscadores (Internet Explorer,……..	SI ☐	NO ☐
2.8	Esta usted familiarizado con el uso de herramientas de comunicación como Messenger o Skype	SI ☐	NO ☐

3. Experiencias previas			
N°	**Aspectos por considerar**		
3.1	Ha tenido alguna experiencia previa en cursos virtuales?	SI ☐	NO ☐
3.2	En qué universidad o institución educativa?		
3.3	Por favor comente sobre las experiencias vividas, fueron positivas o no? Porque?		
3.4	Ha tenido alguna experiencia utilizando herramientas tecnológicas en su labor académica.	SI ☐	NO ☐
3.5	Por favor comente sobre qué tipo de experiencias, fueron positivas o no? Porque?		
3.6	Ha tenido alguna experiencia con el uso de la tecnología como medio para generar oportunidades innovadoras de aprendizaje para sus estudiantes?	SI ☐	NO ☐
3.7	Por favor comente sobre las experiencias vividas, fueron positivas o no? Porque?		
3.8	Ha tenido alguna experiencia con el uso de enfoques pedagógicos como aprendizaje basado en problemas/ proyectos?	SI ☐	NO ☐
3.9	Por favor comente sobre las experiencias vividas, fueron positivas o no? Porque?		

4. Expectativas	
N°	**Aspectos por considerar**
4.1	Por favor comente que lo motiva a tomar este curso
4.2	Que espera usted aprender como resultado del curso y de la interacción con otros colegas?
4.3	Que espera usted mejorar/cambiar/modificar como resultado del curso y de la interacción con otros colegas?
4.4	Cual es su concepción de un ambiente “ideal” de enseñanza-aprendizaje?
4.5	Comente por favor cualquier idea, sugerencia, sueño, ilusión o inquietud que usted quiera transmitir a los diseñadores del curso.

¡Muchas Gracias!

Appendix C
POPP workshop

Mini-project

Task:

We would like you to re-design your course from a POPP/POPBL perspective reflecting the objectives and issues described below.

- What kind of exemplary problems would you like the students to formulate, inquire and solve contextualised in your field and in the theme of the semester/ or course?.
- What kind of theories, methods, ICT and tools do they need in order to work with the problem and the project?
- How are you going to facilitate it? How are you going to evaluate the project?

Theme:

Tourism and sustainability in the north part of Costa Rica / Puntarenas /South part of Costa Rica

Students' credit:

4 credits = about 150 working hours / 18 credits = 700 working hours

These are the objectives given for the course:

It has to address methodological objectives such as learning to learn, learning to collaborate, learning to formulate and solve problems, learning to manage projects, writing scientific reports, gaining confidence in asking questions and becoming active learner, etc. But also subject based goals.

The students together in the project groups have to submit a report of 10 pages (can be multimedia and/or written).

Issues to consider:

Maximum of two credit point for presentations, workshops, seminars. Minimum of two credit points for students work on the project. You have to organise this course in relation to the other courses at the semester.

There have to be elements of ICT used in the students learning methods.

There also have to be considerations concerning how to get the students to formulate a relevant problem which can be the starting point for the students' project

There should also be some considerations of assessment methods and arguments for which assessment methods will fit the learning objectives and the teaching and learning methods.

Your report to the audience

"Mid-term" evaluation: Produce first draft of the mini-project. Present your considerations and questions for discussion.

Appendix D

Interview guide

Note: The interview guide was designed for the researcher, but carried-out by Professor Lone Dirckinck-Holmfeld, supervisor of this study, who was in Costa Rica in March 2008. They were conducted in English with a translation support for teachers who did not speak English.

Guiding questions:

1. What teachers think about to move the curriculum from a more traditional approach to a more student-centered approach as PBL? Which are the challenges and barriers? Do they receive any support from the administration (School/Department/ Top administration)?

2. What teachers think about to use technology to enhance the learning process (not power point – more focus on use of forums, wikis, blogs – tools to foster collaborative work)? Which are the challenges and barriers? Do they receive any support from the administration (School/Department/ Top administration)?

3. What teachers think about the possibility to use Communities of Practice as a framework to support their professional development, as a way to help them to deal with the challenge of innovate their teaching practice?

Appendix E

Questionnaire No.2: Mid-term

Comunidad de Práctica Virtual para la Innovación Académica en las Sedes Regionales de la Universidad Nacional
Valoración Medio Período
Proceso Virtual de Formación Docente

Estimado(a) académico (a):

El propósito de la información solicitada, es conocer su opinión con respecto al proceso de aprendizaje en el que usted está participando. La información será utilizada confidencialmente y servirá para la toma de decisiones que permitirán el mejoramiento del proceso.

A continuación encontrará la escala de calificación cualitativa, cuyo máximo valor es 5 y el mínimo es 1. Por favor marque con una X la opción que se ajuste a su valoración.

5	4	3	2	1
Completamente de acuerdo	De acuerdo	En desacuerdo	Completamente en desacuerdo	No sabe, no responde

1. ORGANIZACIÓN GENERAL DEL PROCESO VIRTUAL DE FORMACIÓN DOCENTE						
N°	**Aspectos por considerar**	5	4	3	2	1
1.1.	La duración del proceso virtual de formación docente es la adecuada	☐	☐	☐	☐	☐
1.2.	La comunicación y divulgación del proceso virtual de formación docente es apropiada y está a su alcance.	☐	☐	☐	☐	☐
1.3.	Las herramientas tecnológicas de comunicación e información que se utilizan son adecuadas y suficientes.	☐	☐	☐	☐	☐
1.4	Observaciones y/o recomendaciones sobre la organización general del proceso virtual de formación:					

2. PROGRAMA DEL PROCESO VIRTUAL DE FORMACIÓN DOCENTE						
N°	**Aspectos por considerar**	5	4	3	2	1
2.1	Se cumplen los objetivos formulados en el proceso	☐	☐	☐	☐	☐
2.2	Los contenidos son pertinentes y de interés para mi práctica docente	☐	☐	☐	☐	☐

2.3	Los contenidos están bien organizados con relación a los objetivos formulados.	☐	☐	☐	☐	☐
2.4	Las actividades propuestas están acordes a los objetivos formulados.	☐	☐	☐	☐	☐
2.4	La bibliografía utilizada es pertinente y actualizada	☐	☐	☐	☐	☐
2.5	Observaciones y/o recomendaciones sobre el programa:					

3. ASPECTOS METODOLÓGICOS						
N°	**Aspectos por considerar**	5	4	3	2	1
3.1	La metodología utilizada fomenta la participación	☐	☐	☐	☐	☐
3.2	La metodología utilizada fomenta espacios para la socialización.	☐	☐	☐	☐	☐
3.3	La metodología utilizada proporciona oportunidades para la reflexión.	☐	☐	☐	☐	☐
3.4	La metodología utilizada proporciona espacios para la discusión de tópicos de interés.	☐	☐	☐	☐	☐
3.5	La metodología utilizada promueve y facilita el trabajo colaborativo.	☐	☐	☐	☐	☐
3.6	Los recursos y actividades incorporadas en el aula virtual apoyan y enriquecen el aprendizaje (lecturas, presentaciones, foros, wikis, tareas, chat, entre otros).	☐	☐	☐	☐	☐
3.7	La mediación pedagógica apoya a los docentes en la integración de las tecnologías digitales a los procesos de enseñanza y aprendizaje de forma pertinente.	☐	☐	☐	☐	☐
3.8	Observaciones y/o recomendaciones sobre lo aprendido en el proceso de formación docente**:**					

4. LO APRENDIDO EN EL PROCESO DE FORMACIÓN DOCENTE						
N°	**Aspectos por considerar**	5	4	3	2	1
4.1	Comprendo los contenidos trabajados en el proceso virtual de formación docente.	☐	☐	☐	☐	☐
4.2	El proceso virtual de formación docente me permite desarrollar habilidades y destrezas tecnológicas para la integración de tecnologías en mi práctica docente.	☐	☐	☐	☐	☐
4.3	El proceso virtual de formación docente me permite desarrollar habilidades para la incorporación de nuevos enfoques pedagógicos a mi práctica docente.	☐	☐	☐	☐	☐
4.4	Lo aprendido es aplicable a mi labor académica.	☐	☐	☐	☐	☐
4.5	Observaciones y/o recomendaciones sobre lo aprendido en el proceso de formación docente:					

Elaborada por: MSc. Xinia Corrales Escalante – MSc. Mayela Coto Chotto
Revisado por: MSc. Willy Castro Guzmán – MSc. Sonia Mora Rivera

5. SU PARTICIPACIÓN EN EL PROCESO DE FORMACIÓN DOCENTE						
N°	**Aspectos por considerar**	5	4	3	2	1
5.1	Cumplo con todas las actividades programadas en el proceso virtual de formación docente.	☐	☐	☐	☐	☐
5.2	Participo activamente en discusiones, reflexiones y comentarios.	☐	☐	☐	☐	☐
5.3	Demuestro una actitud positiva en el desarrollo del proceso virtual de formación docente.	☐	☐	☐	☐	☐
5.4	Comparto con mis compañeros de grupo experiencias y actividades	☐	☐	☐	☐	☐
5.5	Observaciones y/o recomendaciones sobre aspectos relacionados con la participación en el proceso de formación docente:					

6. DISEÑO DEL AULA VIRTUAL DE LA COMUNIDAD DE PRÁCTICA						
N°	**Aspectos por considerar**	5	4	3	2	1
6.1	El diseño del aula virtual de la comunidad es agradable.	☐	☐	☐	☐	☐
6.2	El diseño gráfico del aula virtual de la comunidad invita a la participación.	☐	☐	☐	☐	☐
6.3	Me ubico fácilmente en el aula virtual de la comunidad.	☐	☐	☐	☐	☐
6.4	Es fácil para mí conocer cuáles son las actividades asignadas cada semana.	☐	☐	☐	☐	☐
6.5	Se a donde buscar la información que necesito para participar productivamente en la comunidad	☐	☐	☐	☐	☐
6.6	Observaciones y/o recomendaciones sobre el diseño del aula virtual de la comunidad:					

7. USO DE HERRAMIENTAS TECNOLÓGICAS				
El Aula Virtual de la Comunidad de Práctica posee diferentes herramientas para la comunicación, colaboración y la producción. Por favor establezca su grado de familiaridad con cada una de ellas:				
N°	**Aspectos por considerar**	Ninguno (no puedo participar)	Medio (puedo participar pero no crear uno)	Alto (puedo participar y crear uno)
7.1	Foros	☐	☐	☐
7.2.	Chat	☐	☐	☐
7.3	Blog	☐	☐	☐
7.4	Wiki	☐	☐	☐
7.5	Mensajería	☐	☐	☐
7.6	Observaciones y/o recomendaciones sobre el uso de herramientas tecnológicas:			

MUCHAS GRACIAS!!!

Elaborada por: MSc. Xinia Corrales Escalante – MSc. Mayela Coto Chotto
Revisado por: MSc. Willy Castro Guzmán – MSc. Sonia Mora Rivera

Appendix F

Questionnaire No.3: Final-term

Comunidad de Práctica Virtual para la Innovación Académica en las Sedes Regionales de la Universidad Nacional
Valoración Medio Período
Proceso Virtual de Formación Docente

Estimado(a) académico (a):

El propósito de la información solicitada, es conocer su opinión con respecto al proceso de aprendizaje en el que usted participó. La información será utilizada confidencialmente y servirá para la toma de decisiones que permitirán el mejoramiento de la comunidad de práctica UNAGORA.

A continuación encontrará la escala de calificación cualitativa, cuyo máximo valor es 5 y el mínimo es 1. Por favor marque con una X la opción que se ajuste a su valoración.

5	4	3	2	1
Completamente de acuerdo	De acuerdo	En desacuerdo	Completamente en desacuerdo	No sabe, no responde

1. DISEÑO DEL AULA VIRTUAL DE LA COMUNIDAD DE PRÁCTICA						
N°	**Aspectos por considerar**	5	4	3	2	1
1.1	El diseño del aula virtual de la comunidad es agradable.	☐	☐	☐	☐	☐
1.2	El diseño gráfico del aula virtual de la comunidad invita a la participación.	☐	☐	☐	☐	☐
1.3	Me ubico fácilmente en el aula virtual de la comunidad.	☐	☐	☐	☐	☐
1.4	Es fácil para mí conocer cuáles son las actividades asignadas cada semana.	☐	☐	☐	☐	☐
1.5	Se a donde buscar la información que necesito para participar productivamente en la comunidad	☐	☐	☐	☐	☐
1.6	Observaciones y/o recomendaciones sobre el diseño del aula virtual de la comunidad:					

2. SU DESEMPEÑO EN LA COMUNIDAD DE PRÁCTICA VIRTUAL						
N°	**Aspectos por considerar**	5	4	3	2	1
2.1	Siempre mostré interés y una actitud positiva hacia los temas desarrollados en la comunidad de práctica virtual.	☐	☐	☐	☐	☐

Modificado de: Evaluación Medio Período Comunidad de Práctica Virtual

2.2	Asumí con responsabilidad y compromiso el trabajo planteado en la comunidad de práctica virtual.	☐	☐	☐	☐	☐
2.3	Mi participación en las actividades como foros, tareas, reflexiones, y en los intercambios generales ha sido permanente.	☐	☐	☐	☐	☐
2.4	Casi siempre compartí con mis compañeros de comunidad experiencias, historias y formas de solucionar los problemas presentados en mi práctica docente.	☐	☐	☐	☐	☐
2.5	Intercambié con mis compañeros de comunidad, artículos, presentaciones, tareas y enlaces web, entre otros recursos que contribuyen con el fortalecimiento de la comunidad de práctica.	☐	☐	☐	☐	☐
2.6	Observaciones y/o recomendaciones sobre su desempeño en la comunidad de práctica virtual:					

3. SU IDENTIFICACIÓN CON LA COMUNIDAD DE PRÁCTICA VIRTUAL						
N°	**Aspectos por considerar**	5	4	3	2	1
3.1	Me siento identificado con la comunidad y sus miembros.	☐	☐	☐	☐	☐
3.2	Me siento parte de la comunidad.	☐	☐	☐	☐	☐
3.3	La comunidad me brinda un espacio de confianza donde puedo expresarme libremente.	☐	☐	☐	☐	☐
3.4	Siento que mi aporte es importante y valorado por los otros miembros de la comunidad.	☐	☐	☐	☐	☐
3.5	El pertenecer a la comunidad me permite mejorar mi práctica profesional.	☐	☐	☐	☐	☐
3.6	Valoro positivamente el aprendizaje compartido con mis compañeros de la comunidad.	☐	☐	☐	☐	☐
3.7	Muestro interés en establecer relaciones interpersonales con los miembros de la comunidad.	☐	☐	☐	☐	☐
3.8	Tengo interés en seguir formando parte de la comunidad.	☐	☐	☐	☐	☐
3.9	Estoy dispuesto a adquirir un compromiso con la comunidad, participando y aportando con cierta regularidad.	☐	☐	☐	☐	☐
3.10	Me interesa realizar actividades y proyectos conjuntos con los miembros de la comunidad	☐	☐	☐	☐	☐
3.11	Observaciones y/o recomendaciones sobre su identificación con la comunidad de práctica virtual:					

4. ORGANIZACIÓN GENERAL DEL PROCESO VIRTUAL DE FORMACIÓN DOCENTE						
N°	**Aspectos por considerar**	5	4	3	2	1
4.1	La duración del proceso virtual de formación docente fue la adecuada	☐	☐	☐	☐	☐

Modificado de: Evaluación Medio Período Comunidad de Práctica Virtual

4.2	La comunicación y divulgación del proceso virtual de formación docente fue apropiada y estuvo a su alcance.	☐	☐	☐	☐	☐
4.3	Las herramientas tecnológicas de comunicación e información que se utilizaron son adecuadas y suficientes.	☐	☐	☐	☐	☐
4.4	Observaciones y/o recomendaciones sobre su desempeño en la comunidad de práctica virtual:					

5. PROGRAMA DEL PROCESO VIRTUAL DE FORMACIÓN DOCENTE						
N°	**Aspectos por considerar**	5	4	3	2	1
5.1	Se cumplieron con los objetivos formulados en el proceso	☐	☐	☐	☐	☐
5.2	Los contenidos desarrollados fueron pertinentes y de interés para su práctica docente	☐	☐	☐	☐	☐
5.3	Los contenidos están bien organizados con relación a los objetivos formulados.	☐	☐	☐	☐	☐
5.4	Las actividades propuestas están acordes a los objetivos formulados.	☐	☐	☐	☐	☐
5.5	Observaciones y/o recomendaciones sobre el programa:					

6. ASPECTOS METODOLÓGICOS						
N°	**Aspectos por considerar**	5	4	3	2	1
6.1	La metodología utilizada fomentó la participación.	☐	☐	☐	☐	☐
6.2	La metodología utilizada fomentó espacios para la socialización.	☐	☐	☐	☐	☐
6.3	La metodología utilizada proporcionó oportunidades para la reflexión.	☐	☐	☐	☐	☐
6.4	La metodología utilizada proporcionó espacios para la discusión de tópicos de interés.	☐	☐	☐	☐	☐
6.5	La metodología utilizada promovió y facilitó el trabajo colaborativo.	☐	☐	☐	☐	☐
6.6	Los recursos y actividades incorporadas en el aula virtual apoyaron y enriquecieron el aprendizaje (lecturas, presentaciones, foros, wikis, tareas, chat, entre otros).	☐	☐	☐	☐	☐
6.7	La mediación pedagógica apoyó a los docentes en la integración de las tecnologías digitales a los procesos de enseñanza y aprendizaje de forma pertinente.	☐	☐	☐	☐	☐
6.8	Observaciones y/o recomendaciones sobre aspectos metodológicos en el desarrollo del proceso de formación docente:					

7. LO APRENDIDO EN EL PROCESO DE FORMACIÓN DOCENTE						
N°	**Aspectos por considerar**	5	4	3	2	1
7.1	Comprendió los contenidos trabajados en el proceso virtual de formación docente.	☐	☐	☐	☐	☐

Modificado de: Evaluación Medio Período Comunidad de Práctica Virtual

7.2	El proceso virtual de formación docente le permitió desarrollar habilidades y destrezas tecnológicas para la integración de tecnologías en su práctica docente.	☐	☐	☐	☐	☐
7.3	El proceso virtual de formación docente le permitió desarrollar habilidades para la incorporación de nuevos enfoques pedagógicos e innovación a su práctica docente.	☐	☐	☐	☐	☐
7.4	Lo aprendido es aplicable a su labor académica.	☐	☐	☐	☐	☐
7.5	El desarrollo de la innovación pedagógica le permitió aplicar lo aprendido en el proceso de formación	☐	☐	☐	☐	☐
7.6	Observaciones y/o recomendaciones sobre lo aprendido en el proceso de formación docente:					

8. SU PARTICIPACIÓN EN EL PROCESO DE FORMACIÓN DOCENTE						
N°	**Aspectos por considerar**	5	4	3	2	1
8.1	Cumplí con todas las actividades programadas en el proceso virtual de formación docente.	☐	☐	☐	☐	☐
8.2.	Participé activamente en discusiones, reflexiones y comentarios.	☐	☐	☐	☐	☐
8.3	Demostré una actitud positiva en el desarrollo del proceso virtual de formación docente.	☐	☐	☐	☐	☐
8.4	Compartí con mis compañeros de grupo experiencias de mi práctica docente.	☐	☐	☐	☐	☐
8.5	Observaciones y/o recomendaciones sobre aspectos relacionados con la participación en el proceso de formación docente:					

9. USO DE HERRAMIENTAS TECNOLÓGICAS				
El Aula Virtual de la Comunidad de Práctica posee diferentes herramientas para la comunicación, colaboración y la producción. Por favor establezca su grado de familiaridad con cada una de ellas:				
N°	**Aspectos por considerar**	Ninguno (no puedo participar)	Medio (puedo participar pero no crear uno)	Alto (puedo participar y crear uno)
7.1	Foros	☐	☐	☐
7.2.	Chat	☐	☐	☐
7.3	Blog	☐	☐	☐
7.4	Wiki	☐	☐	☐
7.5	Mensajería	☐	☐	☐
7.6	Observaciones y/o recomendaciones sobre el uso de herramientas tecnológicas:			

MUCHAS GRACIAS!!!

Modificado de: Evaluación Medio Período Comunidad de Práctica Virtual

Appendix G

Workshops Framework

Taller #1: Comunidad (Puntarenas)

Tema	Actividades	Materiales
Bienvenida		
Introducción	Propósito de la comunidad Elementos que caracterizan la cultura docente	Fichas (5 min)
Comunidades de práctica	Construir con lego la dinámica de la experiencia vivida en el proceso (grupal) – 15 min • Introducir los conceptos de CoP • Identificar en la representación cada uno de los conceptos • Ampliar la representación con los nuevos conceptos (aprendizaje)	Legos Carteles con conceptos: •Comunidad de practica •Características Banderitas con todos los conceptos que se quieran
	Es compatible la cultura docente con el concepto de CoP (40 min): • Cultura de compartir, trabajo colaborativo, aprendizaje compartido, compartir la responsabilidad de aprendizaje • Construcción de lazos en la comunidad (sentimiento de pertenencia, unidad de grupo, identificación con las metas, propósitos) • Motivación para innovar la práctica, impacto de la CoP en este proceso • Aprendizaje: competencias tecnológicas, pedagógicas, de comunicación, sociales Futuro CoP:, cómo lograr una mejor experiencia? • Posibilidades. Dificultades, Recomendaciones, Apoyo institucional (10 min)	
Presencialidad vs virtualidad	Evaluar su impacto en la participación (30 min)	Hoja con reflexiones docentes
Evaluación final	Contestar las preguntas (15 min)	Documento Reflexión final

Taller #2: Identidad (Liberia)

Tema	Actividades			Materiales
Bienvenida				
Introducción	Propósito de la comunidad Elementos que caracterizan la cultura docente			Fichas (5 min)
Narrativa como medio de expresión	• Introducción - Presentar la historia – elementos a considerar:			Historia Animarse a volar Lámina con elementos a considerar
	• Sentimientos	• Actitudes	• Aptitudes	
	• Identidad	• Participación	• Colaboración	
	• Valores	• Metas	• Expectativas	
	• Perspectivas	• Situaciones	• Experiencias gratas o difíciles	
	• Cambio	• Lenguaje	• Responsabilidad	
	Construcción de historia – (el propósito de la historia es narrar la experiencia vivida) 30 min			Cromos - Laminas Legos
	Presentación de las historias – 30 min • cambio de identidad • cambio de trayectoria • empoderamiento para transformar la práctica docente • apropiación de un nuevo discurso • desarrollo de competencias			
Presencialidad vs virtualidad	Evaluar su impacto en la participación (30 min)			Hoja con reflexiones docentes
Evaluación final	Contestar las preguntas (15 min)			Documento Reflexión final

Taller #3: Innovación pedagógica (Nicoya)

Tema	Actividades	Materiales
Bienvenida		
Introducción	Propósito de la comunidad Elementos que caracterizan la cultura docente	Fichas (5 min)
Diferentes perspectivas	Construcción de lentes – 15 min	Silicon frio, font, cartulinas tamaño carta de colores, filminas de colores, stickers, tijeras, pilots de colores, papel periodico
Aprendizaje en acción	• Explicar la dinámica a seguir en el taller • Lineamientos de participación -5 min	

	Contestar con caricaturas las siguientes preguntas guías (15 min) • ¿Qué quise cambiar? • ¿Qué estoy haciendo? • ¿Qué impacto ha tenido para mí como docente? • ¿Cuál es la respuesta de los estudiantes? • ¿Qué me gustaría seguir haciendo? (se contesta hasta el final)	
	Compartir la experiencia de las innovación realizada – 1 hora (10 min c/u)	
	• Proceso de realimentación de los compañeros participantes (usando sus lentes que recomendaciones concretas le puede dar a su compañero con respecto a la innovación) – 10 min • Definición de posibles acciones a seguir para mejorar la experiencia – 5 min (contestar la última pregunta)	
Evaluación final	Contestar las preguntas (15 min)	Documento Reflexión final

Taller #4: Diseño de la CoP (Pérez Zeledón)

Tema	Actividades	Materiales
Bienvenida	5 min.	
Explicación de la dinámica	La dirección de docencia les da el apoyo para que basados en esta experiencia se desarrolle una comunidad de aprendizaje para la Sede Brunca. Explicación del propósito y metas de la CoP UNágora Ciclo: experiencia – reflexión - diseño 1 hora	Esquema de la CoP Papeles periódicos Marcadores
Presentación del diseño de la CoP	Que aprendieron? Que cambiarían? Como lo harían mejor?	20 min.
Diseño de la CoP	• perfil de los docentes participantes • procesos de selección • # sesiones presenciales (regularidad, objetivo) • Incorporación de nuevos miembros a la CoP • Estrategias para fomentar la participación • Soporte institucional • Estructura administrativas (carga docente) • Trabajo en grupo (como organizarlos, cuándo?) • Compatibilidad de la cultura docente • Rol del facilitador	1 hora
Evaluación final	Contestar las preguntas (15 min)	Documento Reflexión final

Appendix H

Categories and codes

B	Benefits of participating in the community	B1	Knowledge and skills	B1.1 ICT competences B1.2 Pedagogical competences B1.3 Integration of the new knowledge in the curriculum B1.4 Organizing curriculum with ICT
		B2	Connecting with colleagues	
		B3	Resources	
		B4	Co-construction of knowledge	
		B5	Agent of change	
		B6	Reflection	
M	Motivators What factors played a positive role in teachers' participation in the community?	M1	Establish new relations	
		M2	Professional development	
		M3	Personal engagement	
		M4	Be part of something (belonging)	
O	Obstacles What factors played a negative role in teachers' participation in the community?	O1	Time	
		O2	Overwhelming	
		O3	Fear/afraid to change	
		O4	Technical expertise of academics	
		O5	Institutional technological infrastructure	
		O6	Institutional policies	
		O7	Group dynamics	
		O8	Geographical distance	
		O9	Online communication	
		O10	No participation	
		O11	Over participation	

Appendix I
Invitation and Informed Consent

Estimado académico:

Esta nota es para informarle de la naturaleza y el propósito de la investigación que estoy realizando como parte de mis estudios de doctorado en el programa "Human Centered Informatics" de la Universidad de Aalborg, Dinamarca. El objetivo del estudio es utilizar la teoría de comunidades de práctica como un marco para el diseño de programas de desarrollo profesional. Para ello, se ha diseñado conjuntamente con UNA Virtual un proceso virtual de formación docente cuyo objetivo es promover en los académicos la construcción colaborativa de los procesos de incorporación de las Tecnologías para la Información y Comunicación (TIC) en la educación superior, mediante la conformación de una comunidad de práctica virtual.

Este proceso de formación docente será impartido en línea durante un periodo de 32 semanas, a través del sistema de aula virtual administrado por la Universidad Nacional. El interés primordial de la investigación es analizar el entorno de aprendizaje, comunicación y colaboración que se de en este espacio de formación, por lo tanto mi rol como investigadora será de observación participativa en todas las actividades relacionadas con la investigación tanto virtual como presencialmente. Esto implica que toda la información que fluya a través del sistema de aula virtual podrá ser utilizada para efectos de la investigación. Además, los talleres y sesiones presenciales podrán ser video grabados para el mismo fin y en algunos casos se solicitará a los participantes la posibilidad de participar en entrevistas individuales o grupales.

Durante el periodo de análisis, la información será tratada de forma confidencial y su identidad se mantendrá en anonimato. La presente investigación no implica ningún riesgo para los participantes y los resultados del estudio serán utilizados únicamente para propósitos académicos.

Su participación en la investigación será sumamente beneficiosa porque permitirá contribuir al análisis de nuevas estrategias para el desarrollo profesional docente que realmente apoyen a los académicos en el proceso de innovar su práctica docente.

Si usted está de acuerdo en participar en la investigación, y por consecuente en el proceso de formación docente, por favor firme el formulario de consentimiento a continuación.
Cualquier pregunta sobre esta investigación puede dirigirla a la investigadora:

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Forma de consentimiento

Yo _____ estoy de acuerdo en participar voluntariamente en este estudio y en permitir que los resultados se utilicen para los propósitos de investigación enunciados en la presente forma. Además declaro que:

___ estoy de acuerdo___ no estoy de acuerdo

en que se utilicen imágenes mías como elementos de ilustración en el proyecto de investigación.

Firma _____ Fecha _____

Appendix J

Conceptualization of the project "Design and implementation of an educational innovation"

Diseño y ejecución de una innovación pedagógica

I. Objetivo.

El objetivo de este proyecto es brindar a los docentes la oportunidad de participar en la construcción colaborativa de una innovación pedagógica, que integre las tecnologías para la información y comunicación en los procesos de aprendizaje de acuerdo con el enfoque de aprendizaje basado en problemas y proyectos. La construcción colaborativa de la innovación pedagógica demanda de los participantes asumir un rol dinámico, comprometido y reflexivo.

II. Descripción

Una innovación académica debe formar parte integral del proceso de aprendizaje, permitiendo a los estudiantes experimentar una variedad de estímulos que aportan tanto elementos para provocar un aprendizaje significativo de los contenidos como para desarrollar habilidades, actitudes y valores en los estudiantes.

El uso de estrategias pedagógicas innovadoras y la introducción de las tecnologías digitales en el proceso de aprendizaje permiten al docente poner en práctica un nuevo rol: el de facilitar el aprendizaje, proporcionando a los estudiantes oportunidades, tanto de autoaprendizaje como de aprendizaje colaborativo, seleccionando las estrategias y técnicas más apropiadas de acuerdo con el área de estudio del curso. Este cambio en el papel del profesor conlleva una modificación en el papel del estudiante al convertirlo en un sujeto activo que construye su conocimiento y adquiere mayor responsabilidad en todos los elementos del proceso. Por ejemplo, en un proyecto los estudiantes definen los objetivos, determinan las estrategias, distribuyen responsabilidades, establecen compromisos y se autoevalúan a través de un proceso de reflexión permanente sobre lo que logran y sobre la forma en que lo logran. De esta manera el producto final no es más importante que el proceso mismo de reflexión y aprendizaje que se da a lo largo del desarrollo.

Para el diseño de una innovación académica propia a las características del grupo y al tipo de curso que se imparte deben tomarse en cuenta algunas consideraciones, como las siguientes:

- Desatar la creatividad: la principal atadura para innovar en el proceso educativo se encuentra en las actitudes, una vez que se ha roto esta atadura es más fácil para el docente proponer formas distintas de trabajo a las tradicionales.

• Determinar con claridad el objetivo: un elemento fundamental en el proceso de diseño de una innovación académica se observa en la necesidad de que el profesor defina en términos muy claros los objetivos que desea lograr en los estudiantes. Estos objetivos tienen que ver con el efecto de la innovación en el grupo y en el estudiante en lo particular. Además el diseño de la innovación debe considerar un desarrollo intencional de habilidades, actitudes y valores, incorporándolos como objeto de aprendizaje en el curso y diseñando los procesos para desarrollarlos y evaluarlos.

• Proponer actividades factibles: las actividades propuestas como parte de la innovación académica deben estar apegadas a las capacidades, recursos y posibilidades de los estudiantes, sin llegar a menospreciar las posibilidades de los estudiantes, pero apegándose a actividades que sean factibles.

• Desarrollar el procedimiento: un excelente aporte del docente a su práctica y a la del resto de los docentes, es contar con una descripción del procedimiento que ha seguido en el diseño e implementación de una innovación académica, de tal modo que en un momento posterior sea factible su ejecución en un grupo diferente.

III. Fases del proyecto:

El proyecto se desarrolla en cinco fases:

1. Formación del grupo y formulación del proyecto: en esta fase el grupo se enfoca en la negociación de identidades con el objetivo de convertirse en un grupo productivo con una identidad colectiva, una forma de trabajo y una meta común. En esta fase se negocia y se define el problema que se desea solucionar. Una guía para orientar esta primera fase puede verse al final de este documento (ver guía #1). El producto de esta fase es un documento que expresa y fundamenta el problema seleccionado.

2. Investigación y diseño de una innovación académica en grupo: una vez seleccionado en la fase anterior el problema educativo sobre el cual el grupo desea trabajar, se inicia una fase de investigación sobre diferentes tópicos relevantes al problema, construyendo un entendimiento común sobre los mismos, que permita generar una propuesta creativa de "solución" al problema, considerando como los enfoques pedagógicos innovadores y las tecnologías digitales pueden contribuir en este proceso. Esta fase requiere de un trabajo colaborativo de aprendizaje y reflexión orientado al diseño pedagógico y metodológico de la innovación, que se convierte posteriormente en el marco de referencia para que cada docente aplique y ajuste su innovación a su área de especialidad y a sus propios cursos. El producto de esta fase es el diseño pedagógico y metodológico de la innovación (ver guía #2).

3. Formulación de la innovación a desarrollar individualmente: tomando como marco de referencia el diseño pedagógico y metodológico de la innovación, elaborado en la fase anterior, cada docente realiza los ajustes necesarios para poder implementarla en su área de especialidad, considerando la naturaleza de la misma, las capacidades tecnológicas de sus estudiantes, los recursos a su disposición, entre otros. El producto de esta fase es el diseño pedagógico y metodológico de la

innovación individual. La guía #3 presenta un formato para planear y documentar individualmente la aplicación de una innovación pedagógica.

4. Ejecución de la innovación académica y evaluación: puesta en marcha de la innovación por cada uno de los miembros del grupo y evaluación del proceso para mostrar los resultados obtenidos (ver guía #3). En esta fase el docente debe conceptualizarse a si mismo como un investigador, que aplica una innovación evaluándola continuamente en función de la respuesta de los estudiantes y de su propia percepción y consecuentemente plantea los ajustes necesarios. Todo el proceso y las decisiones tomadas durante el mismo deben ser cuidadosamente documentadas.

5. Presentación de los resultados: se comparte una síntesis de todo el proceso con los miembros del grupo y con toda la comunidad mediante un foro. Posteriormente cada grupo selecciona dos de las innovaciones para ser compartidas con todos los miembros de la comunidad en una sesión presencial.

Fase	Fechas	Duración	Productos	Fecha de Entrega
I	31 marzo – 18 abril	3 semanas	1. Documento grupal (guía #1, punto 5). Se entrega como una tarea. 2. Documento síntesis en el Foro Avancemos	Ambos productos deben compartirse con la comunidad en la semana del 21 al 25 de abril
II	28 abril – 23 mayo	4 semanas	1. Documento grupal (guía #2). Se entrega como una tarea. 2. Documento síntesis en el Foro Avancemos	Ambos productos deben compartirse con la comunidad en la semana del 26 al 30 de mayo
III	2 junio – 20 junio	3 semanas	1. Documento individual (guía #3, puntos del 1 al 10). Se entrega como una tarea. 2. Documento síntesis en el Foro Avancemos	Ambos productos deben compartirse con la comunidad en la semana del 23 al 27 de junio
IV	21 julio – 3 octubre	11 semanas (9 semanas implementación y 2 de evaluación)	Documento individual (guía #3, puntos del 1 al 12). Se entrega como una tarea.	El documento debe compartirse con la comunidad en la semana del 6 al 10 de octubre
V	20 – 24 octubre	1 día (por definir la fecha)	Presentación (Power Point) con una síntesis de la innovación realizada	Presentación de resultados en reunión presencial

Guía No. 1

Iniciando el proyecto

1. Formando el equipo de trabajo: Cada grupo debe generar normas que le permitan realizar un proceso armonioso y fructífero de aprendizaje.

   1.1 .Se sugiere definir un nombre y un logo que represente al grupo.

   1.2. Elaborar un acuerdo interno referente a derechos y deberes. Los siguientes ejemplos pueden servir de base para la negociación:

   • Todos nos comprometemos a participar activamente.

   • Si alguna persona no puede participar por cualquier motivo, debe comunicarlo al coordinador del grupo.

   • Las contribuciones de cada uno de los miembros es igualmente valiosa.

   • Si algún miembro tiene problemas para entender un determinado tópico, los demás miembros se comprometen a ayudarlo.

   • Todos somos responsables por nuestro propio aprendizaje y por el aprendizaje de nuestros compañeros.

   • El rol debe cambiar en los participantes mínimo cada 6 semanas.

   1.3. Distribución de roles y tareas: para una adecuada distribución de las responsabilidades dentro de los miembros del grupo se recomiendan los siguientes roles:

   • Coordinador: inicia la discusión y la mantiene viva, planifica, promueve y organiza las tareas que se deben realizar. Debe crear en el ambiente de trabajo del grupo las actividades necesarias (Chat, foros, wikis) para establecer un adecuado proceso de comunicación y colaboración.

   • Investigador: busca material de apoyo, información relevante y actualizada que soporte al grupo en el desarrollo del proyecto, ejemplos, entre otros.

   • Redactor: documenta el proceso seguido, las ideas y acuerdos tomados por el grupo. Es el encargado de mantener y actualizar toda la documentación interna que se genere dentro del grupo.

   • Reportero: comunica los resultados a los otros grupos, es el encargado de hacer las síntesis en el foro permanente "Avances del proyecto" y de actualizar el glosario de la comunidad con los conceptos importantes.

   • Facilitador: vela porque todos los miembros del grupo participen. Interactúa con los otros grupos en el foro permanente "Avances del proyecto" y realimenta a sus compañeros con esta información. Plantea las dudas del grupo al facilitador de la comunidad.

   1.4 Establecer una estrategia de trabajo que permita establecer un adecuado ritmo de colaboración dentro del grupo. A manera de ejemplo se sugiere:

o Establecer un horario interno de trabajo para el desarrollo de las diferentes tareas.

o Definir las diferentes formas de comunicación entre los miembros del grupo.

2. Negociación y definición del problema a solucionar. El grupo debe seleccionar una problemática, una necesidad educativa o un tópico que sea interesante y estimulante para los estudiantes y para los docentes, para ello realizan un análisis de las necesidades o dificultades de aprendizaje (por ejemplo baja motivación, ausentismo, bajo rendimiento, baja participación, bajo compromiso, tópicos muy abstractos, no relación clara entre el tópico y su aplicación práctica, entre otros.) y seleccionan un problema que quieran intentar solucionar/modificar mediante una innovación pedagógica que haga uso de las TICs y de enfoques pedagógicos socio-constructivistas.

   2.1.Para este proceso, se puede utilizar un foro inicialmente donde se genere una lluvia de ideas al respecto, y cada uno de los integrantes del grupo exprese cual es un problema que tiene en su curso que desearía tratar de cambiar, y los demás miembros pregunten y profundicen, para tratar de entender claramente el problema.

   2.2.Después se puede utilizar un Chat donde todos los participantes comenten y seleccionen el problema que desean como grupo investigar.

   2.3.Todo el proceso debe ser adecuadamente documentado por el redactor del grupo.

   2.4.Una vez tomada una decisión, esta debe ser fundamentada de acuerdo a las expectativas de los miembros del grupo.

3. Elaboramos un mapa conceptual o esquema con al menos 10 ideas o conceptos que tengamos con relación a la problemática a solucionar. Aquí es importante considerar: cuál es el problema, quién lo tiene, qué lo causa, y cómo se puede solucionar.

4. Se realiza una breve indagación inicial sobre el problema a solucionar en diferentes fuentes (libros, internet, enciclopedias, entrevistas, otros disponibles)

5. Se genera un documento tipo brochure que contenga un esquema inicial de cuál es el problema, quién lo tiene, qué lo causa, y cómo se puede solucionar, así como un plan de acción inicial (distribución de tareas, acciones más relevantes).

6. Se comparte con el resto de la comunidad las decisiones tomadas. El reportero del grupo genera una síntesis y expone en el Foro Avancemos de manera breve aspectos relevantes que desarrollarán en el Proyecto.

Guía No. 2
Diseño Conceptual y Metodológico de la Innovación Pedagógica

1. Definición del problema: cuál es el problema, quién lo tiene, qué lo causa, y cómo se puede solucionar.
2. Titulo de la innovación: un titulo creativo y significativo.
3. Objetivos: Se debe enunciar claramente los aprendizajes que se necesita que el estudiante construya en la propuesta de innovación pedagógica (desarrollar habilidades como el trabajo en equipo, criticidad, creatividad, liderazgo, construcción del conocimiento).
4. Metodología: enfoque pedagógico y métodos utilizados para el diseño, la implementación y la evaluación de la innovación propuesta.
5. Actividades de aprendizaje: se deben indicar las actividades que se desarrollarán por parte del docente y de los estudiantes, así como los objetivos que persigue cada una de ellas.
6. Actividades de evaluación: es necesario incluir actividades de evaluación que propicien la auto-evaluación, la co-evaluación y la evaluación unidireccional por parte del docente.
7. Recursos necesarios.
8. Duración de la innovación
9. Diseño de un instrumento que permita evaluar la innovación desde el punto de vista de los estudiantes.
10. Diseño de un instrumento que permita evaluar la innovación desde el punto de vista del docente.
11. Sugerencias de cómo evaluar el efecto de la innovación pedagógica en el aprendizaje de los estudiantes.

Guía No. 3
Implementando y evaluando la Innovación Pedagógica

1. Título:
2. Curso:
3. Área disciplinaria:
4. Nombre del profesor:
5. Tema(s) a tratar:
6. Objetivos:
7. Momento del curso en el que se aplica la innovación (periodo del semestre):
8. Descripción detallada de la propuesta de Innovación académica. (Qué y el para qué de la Innovación pedagógica, actores involucrados, actividades realizadas, entre otros)
9. Cronograma de la innovación
10. Recursos necesitados:
11. Evaluación: se deben mostrar y comentar los resultados de la aplicación de los instrumentos de evaluación.

12. Presentación de la innovación y sus resultados: cada docente debe facilitar una discusión y evaluación general del proyecto para compartirla con todos los miembros de la comunidad (considerando el diseño de la innovación, las reglas para su ejecución, los roles de los participantes, el tiempo y recursos requeridos para la innovación), además se debe presentar una reflexión sobre la innovación pedagógica: sobre lo que funcionó bien y sobre lo que se debe mejorar o necesita modificarse para la próxima vez que integre TIC en los procesos de aprendizaje. Posteriormente cada grupo selecciona dos de las innovaciones para ser compartidas con todos los miembros de la comunidad en una sesión presencial en la semana del 20 al 24 de octubre.

Appendix K

Synthesis of the group work: Designing the Future of UNAgora

Dominio (base de conocimiento que UNAGORA quiere desarrollar)

¿Qué queremos hacer/ aprender?	▫ Continuar innovando la práctica docente
	▫ Utilizar las TICs en los procesos de enseñanza-aprendizaje ▫ Dominar las herramientas tecnológicas de punta. ▫ Mejorar el proceso pedagógico a través de las TICs ▫ Promover entre nuestros estudiantes el uso de las TICs incorporándolos en los programas.
	▫ Inducción a la plataforma virtual y sus herramientas. ▫ Capacitación sobre la aplicación de las TICs en el Aula. ▫ Capacitación en el uso del software innovador necesario para el uso de la comunidad. ▫ Conocer otras plataformas.
	▫ Perfeccionar el manejo de los TICs en nuestra labor académica.
	▫ Capacitación en el uso de nuevas herramientas y repaso en el uso de herramientas ya utilizadas. ▫ Vivenciar más o mejorar (ejemplificar, ilustrar con situaciones reales, el uso de POBL.
¿Por qué es importante para la UNA?	▫ Integración de conocimientos ▫ Mejoramiento de la calidad ▫ Mejoramiento comunicación institucional
	▫ El modelo pedagógico vigente está dirigido a un nuevo programa pedagógico en materia virtual. ▫ La educación superior tiene la obligación de permear los procesos de enseñanza y aprendizaje en materia tecnológica y la Universidad no puede quedarse en este proceso.
	▫ Parte de fortalecer el modelo pedagógico de la UNA. ▫ Es necesario que la UNA adopte las nuevas metodologías de aprendizaje.
	▫ Para estar a la vanguardia de este nuevo siglo, y la demanda de actualización que exige nuestras estudiantes.
	▫ Mantiene y mejora el proceso de renovación a nivel institucional y a la vez, genera procesos de cambio, necesarios en esta era tecnológica.
	▫ Mantiene y mejora el proceso de renovación a nivel institucional y a la vez, genera procesos de cambio, necesarios en esta era tecnológica.
¿Por qué es importante para los miembros actuales?	▫ Mantenerse activos. ▫ Continuidad del proceso.
	▫ Comprender que es de suma importancia el rumbo que debemos tomar en materia tecnológica. ▫ La capacitación permanente durante 8 meses en forma independiente de tiempo y espacio.
	▫ Relación entre sedes – subsedes – estaciones y el enlace a la Sede Central. ▫ Participar de manera proactiva en Foros especializados.

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	▫ Para mejorar en nuestras prácticas docentes.
	▫ Estar actualizando, mantener la educación continua.
	▫ Es vínculo, punto común y de referencia para, tanto los miembros de la comunidad (UNAGORA), como para la comunidad universitaria en general.
¿Por qué sería importante para los nuevos miembros?	▫ Integración basada en experiencias previas. ▫ Aporte de nuevas ideas y experiencias
	▫ Para fortalecer la comunidad. ▫ Para aumentar la masa crítica. ▫ Crear nuevos espacios de socialización con compañeros de diferentes especialidades.
	▫ Para fortalecer la comunidad. ▫ Para aumentar la masa crítica. ▫ Crear nuevos espacios de socialización con compañeros de diferentes especialidades. ▫ Para permitir nuevas maneras de pensar y el compartir experiencias y dudas.
	▫ Fortalece la permanencia dentro de la comunidad. ▫ Motivar más a la participación dentro de la comunidad.
	▫ Encontrar espacios acorde a sus necesidades e intereses.
	▫ Es importante en cuanto se perfile como un "grupo de apoyo" para miembros emergentes y que además permita la consolidación de una comunidad activa.

Práctica (acciones, aprendizaje, actividades necesarias para mejorar la práctica docente)

Conocimiento más útil para compartir, para documentar, o para desarrollar	¿La mejor manera de compartir?
▫ Experiencias. ▫ Conocimientos	▫ Foros
▫ Autonomía universitaria. ▫ Modelo Pedagógico, su implementación. ▫ Plan de relevo U.N.A. ▫ Normativa interna en función de docentes y estudiantes. ▫ La innovación tecnológica permanente.	▫ Foros con expertos. ▫ Chats ▫ Wiki
▫ Conformar una memoria de la experiencia de UNAgora, con el fin de tener material de apoyo y consulta.	▫ Socializando la información a través de espacios de reflexión en cada campus
▫ Uso de las herramientas. ▫ Sistematizar experiencias en ponencias o en plataformas	▫ Diálogo ▫ Publicar

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Actividades de aprendizaje (foros, chats, trabajo en grupo, trabajo individual, sesiones presenciales, etc)	Propósito	Con qué frecuencia?
▫ Foros ▫ Sesiones presenciales	▫ Compartir conocimiento y experiencias ▫ Evaluación de proceso	▫ Cada 15 días ▫ 1 mes
▫ Foros ▫ Chats ▫ rabajo en grupo ▫ Trabajo individual ▫ Sesiones presenciales	▫ Intercambiar pensamiento y generar discusión. ▫ Socializar ▫ Análisis crítico personal ▫ Calor humano	▫ Cada 15 días ▫ Cada semana ▫ 1 vez cada 15 días ▫ Constante ▫ 1 por mes
▫ Dividir las herramientas por módulos de aprendizaje. ▫ Tomar en cuenta las sesiones presenciales	▫ Evaluar el logro obtenido en cada herramienta ▫ Conocer más a los compañeros y abrir espacios de comunicación cara a cara.	▫ Mensualmente. ▫ Mensuales (una en cada sede).
▫ Foros. ▫ Uso de los TICs para enriquecer la información.	▫ Romper miedos y temores al uso de los TICs. ▫ Fomentar la investigación.	▫ Mínimo tres por Ciclo. ▫ Lo que el mismo programa exige.
▫ Foros ▫ Chat ▫ Trabajo en grupo ▫ Sesiones presenciales	▫ Compartir opiniones. ▫ Aclarar dudas. ▫ Resolución de problemas. ▫ Capacitación, revisión y actualización	▫ Quincenal ▫ Semanal ▫ Mensual

Comunidad (fortalecimiento y crecimiento de la comunidad)

¿Qué valoramos?	¿Cómo promover el sentido de pertenencia y el compromiso?
▫ Participación ▫ Compromiso	▫ Inducción ▫ Motivación ▫ Crear necesidad
▫ Responsabilidad ▫ Respeto mutuo ▫ Compromiso	▫ Motivación constante
▫ El trabajo realizado por los encargados del proyecto (excelente)	▫ Fortalecer la confianza entre los compañeros con sesiones presenciales de mayor duración. ▫ Establecer áreas de interés comunes para fortalecer las relaciones de los compañeros.
▫ La comunidad continúa. ▫ Las experiencias individuales.	▫ Tener claro que es una necesidad, individual, institucional.
▫ Respeto – opiniones. ▫ Colaboración entre compañeros. ▫ Perseverancia e interés	▫ Convivio ▫ Talleres ▫ Charlas

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Tipos de nuevos miembros (docentes que hayan realizado innovaciones, con experiencia en el uso de tecnología, novatos, de las sedes regionales, de la sede central, etc)	Cómo los incorporamos?
▫ Novatos ▫ Nativos ▫ Expertos	▫ Procesos de inducción ▫ Estrategia ▫ Maximizar recursos
▫ Mixto	▫ Invitación personal
▫ Personas con compromiso y con intenciones de aprender.	▫ Invitación personal
▫ Todo el cuerpo académico de la Sede.	▫ Coordinando con las autoridades de la Sede.
▫ Novatos ▫ Sede Central ▫ Sede Regionales	▫ Reuniones informativas ▫ Compartiendo experiencias ▫ Compartir experiencias ▫ Visitas - Campus

Roles			
Coordinador	▫ UNA-Virtual (Coordinador general)	▫ Que disponga de tiempo y capacidad de liderazgo.	▫ Coordinador por Campus. ▫ Coordinador de UNA Virtual y los miembros de la Comunidad.
Miembros del grupo central de apoyo	▫ Comisión UNAGORA (Ad hoc) = Recursos	▫ Aquellos que responsablemente se ofrezcan.	▫ Coordinador Heredia e investigadora, miembros de la Comunidad de cada Campus o Sede.
Expertos	▫ Invitados	▫ Los que tengan dominio del tema.	▫ Apoyo de la facilitadora y la investigadora además de los coordinadores tecnológicos de los campus
Otro Técnico	▫ UNA Virtual		

'Organización (apoyo institucional necesario para el fortaleciendo de la comunidad)

Roles	Quién (es)?	¿Qué necesitamos de ellos?
Estrategia global de desarrollo	▫ Vicerrectoría Docencia	▫ Tiempos y presupuestos
	▫ Autoridades de la Sede	▫ Espacios flexibilidad laboral, tiempos o cargas académicas.
	▫ UNA – Virtual	▫ Organización
Patrocinio de la comunidad	▫ Entidades Institucionales	▫ Permanencia
	▫ Autoridades Sede Central	▫ Acceso a los laboratorios.
	▫ UNA	▫ Institucionalización

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Apoyo logístico	▫ UNA-Virtual	▫ Permanencia
	▫ Técnico de laboratorios	▫ Acompañamiento en el proceso
	▫ FUNDA UNA, UNA	▫ Económico
Apoyo tecnológico	▫ Escuela Informática	▫ Permanencia
	▫ Técnico de laboratorios	▫ Acompañamiento en el proceso
	▫ INTEL / CONICIT/ ▫ Escuela Informática	▫ Apoyo Tecnológico

Responsabilidad: qué puede esperar la UNA de la comunidad UNAGORA?	**Reconocimiento: ¿cómo se deben reconocer las contribuciones de la comunidad?**
▫ Capacitación permanente	▫ Debe existir divulgación
▫ Una comunidad innovadora y líder en el campo de motivación e incorporación de nuevos compañeros.	▫ Con tiempos académicos. ▫ Mantener prioridad en nuevos espacios de capacitación. ▫ Respetar los perfiles de formación académica en el desarrollo de los cursos.
▫ Incursión en nuevas tecnologías ▫ Compromiso	▫ Títulos, certificados ▫ Carrera Académica ▫ Conferencias, ponencias y pasantías.

Recursos requeridos	**Tecnología**
▫ Financieros ▫ Equipo	
▫ Apoyo de laptop	▫ Laboratorios. ▫ Banda Ancha ▫ Capacitación continua.
▫ Tecnológico ▫ Económico ▫ Humano	▫ Ancho de banda ▫ Equipo nuevo ▫ Aulas virtuales en sedes.

Actividades a corto plazo	**Quién la realiza?**
▫ Continuar con la comunidad ▫ Motivar a otros docentes a participar. ▫ Recomendar a los autoridades de la Sede implementar el uso de las TICs ▫ Compartir experiencias con compañeros.	▫ Los miembros de la comunidad. ▫ Miembros de comunidad de cada Sede. ▫ Miembros de la comunidad de cada sede. ▫ Miembros de la comunidad y dirección académica.

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▫ Foros de apoyo ▫ Chat de dudas ▫ Reunión por área para compartir experiencias (virtual) ▫ Reuniones periódicas presenciales ▫ Convivio	▫ Comunidad ▫ UNA-Virtual ▫ Comunidad ▫ Coordinador de Sede ▫ Comunidad

¿Cómo nos vemos en 9-12 meses?
▫ Impartiendo cursos bimodales. ▫ Actualizando currículos ▫ Actualizando los diseños de carrera. ▫ 100% de los docentes capacitándose en los TICs.
▫ Mayor nivel de aprendizaje. ▫ Mayor compromiso en la comunidad. ▫ Ayudando, colaborando con compañeros nuevos. ▫ Montando nuevos cursos en la plataforma. ▫ Compartiendo experiencias en congreso de las TIC.

¿Qué habremos hecho a largo plazo?
▫ Dinamizar y actualizar la Universidad de acorde a las necesidades del siglo XXI
▫ Cambio de metodología mediante clases más activas, propiciando aprendizajes significativos.

¿Qué diferencia habremos hecho para la UNA? (a largo plazo)
▫ Reafirmar el lema de la Universidad, “La universidad necesaria”
▫ Pioneros en el uso de las TIC ▫ Desarrollar una nueva percepción de los cursos en la UNA para los estudiantes.

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